MARCH 20, 1941

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The IRON AGE

INLAND

EXPERIENCED MEN AND
MODERN MILLS PRODUCE INLAND QUALITY STEEL

INLAND STEEL CO.

Chicago, Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

SHEETS · STRIP · TIN PLATE · BARS · PLATES · STRUCTURALS · PILING · RAILS · ETC.

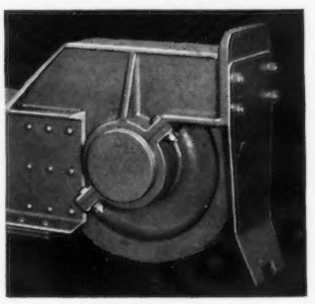
"That GRINDING in your cranes is a sure sign of WEAR!"

You can't have noise in a crane without having wear, excessive maintenance, and expensive repairs. The extra quietness and longer life of Whiting cranes are due to their smooth-running herringbone gears, their heavy-duty roller bearings, their tapered-tread drive wheels, flexible couplings, and many other unusual features. Available in capacities from 1 to 400 tons. Also, electric hoists from ½ to 7½ tons. Whiting Corporation, 15601 Lathrop Ave., Harvey, Ill. In Canada, Whiting Corporation (Canada), Ltd., Toronto.

Builders of quality cranes for over 50 years.

Send for Booklet "How to Write a Traveling Crane Specification." Free to production executives.

Rotating Axle Bearings Reduce Noise and Wear in WHITING Cranes



Two heavy-duty roller bearings support the rotating-type, forged steel axle. Bearing pads are machined after the truck frame is welded. Thus, wheels are in perfect alignment and run perfectly true and free.

It pays to get a quotation on

WHITING

OVERHEAD TRAVELING CRANES

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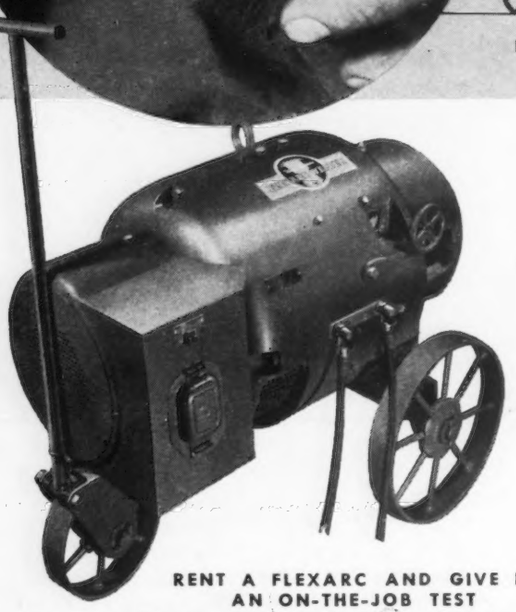
Don't Buy Any Welder Until You Make The *FLEXARC 200-FOOT TEST*

For 200 feet or similar long cable runs—there's no running back to a FlexArc for readjustments.



RENT A FLEXARC AND GIVE IT AN ON-THE-JOB TEST

Here's a real showdown! Rent a FlexArc—see how it stacks up in *your* hands, on *your* job. Easy terms—no obligation to buy. Rental can be applied against purchase price.

Stop in today at any Westinghouse dealer's and make the FLEXARC 200-FOOT TEST. It's a revelation in what you can do with a modern FlexArc Welder.

Just pre-set FlexArc's ONE control—walk off 200 feet, or more, to the job—and weld.

Watch FlexArc give you *automatically* the exact arc you need for any position of the rod—downhand, vertical, overhead, or all in quick succession. Note how current readjustments after warm up are unnecessary—how you never have to chase back to the machine whether you weld for five minutes or five hours.

Consider what these features can mean to you—ability to lay down more metal per hour than you ever did before—no lost time walking back to the machine—better welds because the arc's always right. You'll agree—it pays to make the FLEXARC 200-FOOT TEST before you buy any welder!

WESTINGHOUSE ELECTRIC & MFG. CO.
DEPT. 7-N EAST PITTSBURGH, PA.

J-21067

Westinghouse Flexarc Welders

The Iron Age

MARCH 20, 1941

ESTABLISHED 1855

Small Talk—Big Talk

RELATIVE to "The Girl He Left Behind Him" and "Ten Thousand Frying Pans," an advertiser writes us as follows:

"Granting that it is doubly important to keep your name before your customers when you cannot meet their demands for your product, what can you use for advertising 'copy'?"

There *is* an answer to that and it reminds me of a story.

A bashful lad was invited to his first party. He was afraid that he would not be able to engage successfully in conversation, particularly with the young ladies. So he went to an experienced friend for advice as to what to say to them.

"Well," said the expert, "a lot of the fellows find that they can get by with small talk. You start in with the weather and then begin to talk about yourself. That gives a fellow a lot of room to tell how good he is, how fast he can run, how high he can jump and how he made the winning touchdown for good old Jonesville High. That's the small talk method and it will probably 'get you by' if you work it right.

"The only trouble with that method," continued the expert, "is that so many of the boys are using it that you will have lots of competition. If you want to really get results, I'd advise using big talk instead of small talk."

"How do you do that?" asked the beginner.

"Well, instead of talking about yourself, you talk to the girl about herself. You can always break the ice by telling her how beautiful she looks to you. All of them like to hear that especially if you say it as though you meant it. Then find out the things she is most interested in. Maybe it's algebra and maybe it's roller skating. If you are dumb at algebra but good on skates you can offer to teach her some new steps. If you're a mathematical shark but slow on your feet you can offer to help her with her homework.

"That's the big talk method," continued the expert. "The small talk method may get you by; the big talk method gets good will and results. And these are what count."

So, Mr. Advertiser, you have two ways in which to meet your problem of copy in advertising when you are so loaded you don't want to see another order for three or six months, but you do want to hang on to your customers in view of the "seven lean years" that are surely coming when this buying orgy is over.

You can use "institutional" copy and tell how old your company is, how good it is, how large it is and how a year's output would reach from here to the moon. Or, you can take the other method and help your customers with their homework.

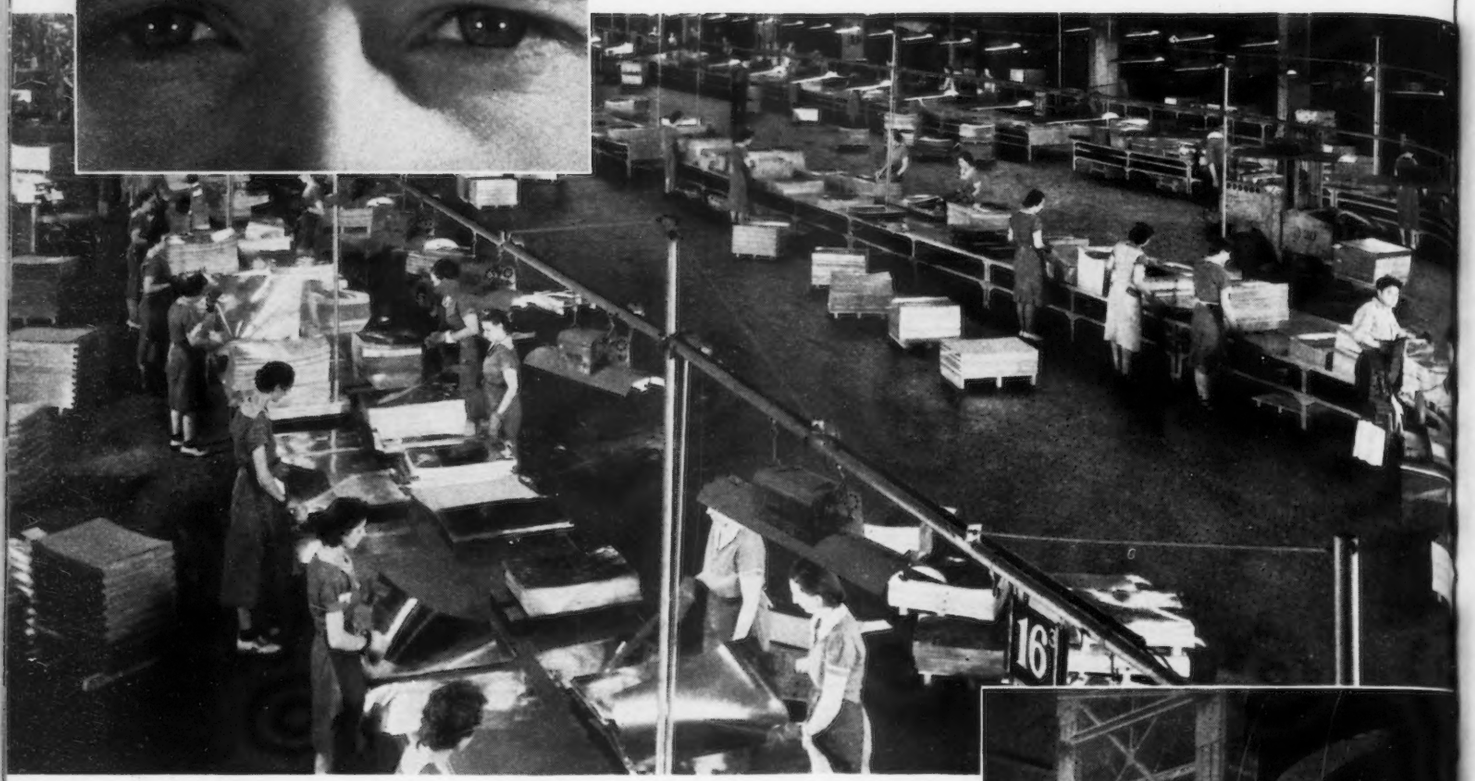
Maybe you cannot ship them one of your new 1941 model acrobatic automatics. But perhaps they already have a battery or two of your 1937 models and would be tickled pink to have you suggest ideas to them for increasing their output.

Maybe you cannot give them all of the materials or tool steels that they would like to buy but you can, perhaps, suggest ways of eliminating waste in use and of making 12 ounces do the work of a pound.

That's the big talk that we need in advertising today!

T. W. Lawrence

Thousands of Trained Eyes
Assure Inland Quality



Keen eyes inspect Inland Cold Reduced Tin Plate

THROUGHOUT the Inland Plants there are thousands of eyes that critically watch every phase of making Inland Quality Steel. They are eyes trained by many years of close observation to know the exact requirements of Inland customers—trained to detect the slightest variation from Inland standards.

Many of these eyes are in laboratories, some checking production and processes, and others looking far into the future by means of continual intensive research. Every operating floor has its full quota of trained eyes that carefully watch each step of every steelmaking process. Not a pound of steel is shipped from an Inland Plant without first having satisfied the searching, critical eyes of Inland inspectors.

It is this keen watchfulness, combined with great steelmaking skill and modern equipment, that assures the uniform high quality of Inland Steel.

Skilled eyes take the temperature of molten steel with an optical pyrometer.

INLAND STEEL CO.

SHEETS · STRIP · TIN PLATE · BARS · PLATES · FLOOR PLATES · STRUCTURALS · PILING · RAILS · TRACK ACCESSORIES · AND REINFORCING BARS

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Tool Angles For Steel Cutting With Carbides

By HARRY S. WILCOX
Equipment Engineer, Worthington Pump & Machinery Corp., Harrison, N. J.

THE application of cemented carbide tools on steel turning presents many interesting factors and warrants a close study by those looking for the successful use of these tools in their plants. It is during their first attempts to use carbides that many may become discouraged by the disappointing results obtained as compared to the results they contemplated. It would be well for those starting their experience with carbides or those considering the wider use of carbides for steel cutting to give thought to each of the following factors: power available, power required, belt or clutch condition, possible results of power failure and the effect of cutting angles on power consumption or input. These factors are all relative and on them depends the success or failure of economical application of carbides in a plant.

Obviously, for example, if one were to attempt to turn a bar of steel of free cutting low carbon screw stock at a speed of 250 ft. per min., using a feed of 0.015 in. per rev. and a depth cut of 7/32 in., some sort of check should be made first to determine whether there is power available to pull the machine at these feeds and speeds with this depth of cut. The common way of yesterday and today is the cut-and-try method, starting with slower speeds and lighter feeds. This method, under favorable machine conditions, may be satisfactory, but it is unnecessary, since it is usually easy to find out what power is available to each machine—be it motorized or belt driven from lineshaft. Once this is known, it is then advisable to determine what the power required is for a given cut. This power required can be ascertained by the use of several formulas. A simple formula, such as the following, can be used for the approximation of horsepower required:

$$Hp. = D \times F \times S \times C$$

Where D = Depth of cut, in.
F = Feed in in. per rev.
S = Surface speed, ft. per min.
C = Constant of 8, used only for approximation on steel cutting.

This formula tells one if it is safe or not to use proposed feed speed and depth of cut. Assuming power available and power required adequate, the clutch and belt conditions should be checked to make sure that both are properly adjusted. If these precautions are taken, then many of the tool failures of one's first attempt in

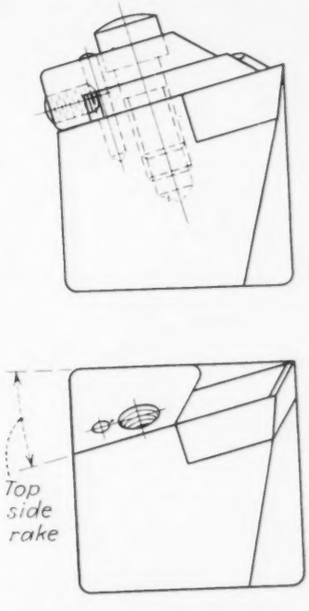


FIG. 1—Spacing of the chip curler back of the cutting edge should be varied with the amount of feed if the power going into this function is to be kept at a minimum. The drawing shows a successful form of adjustable chip curler.

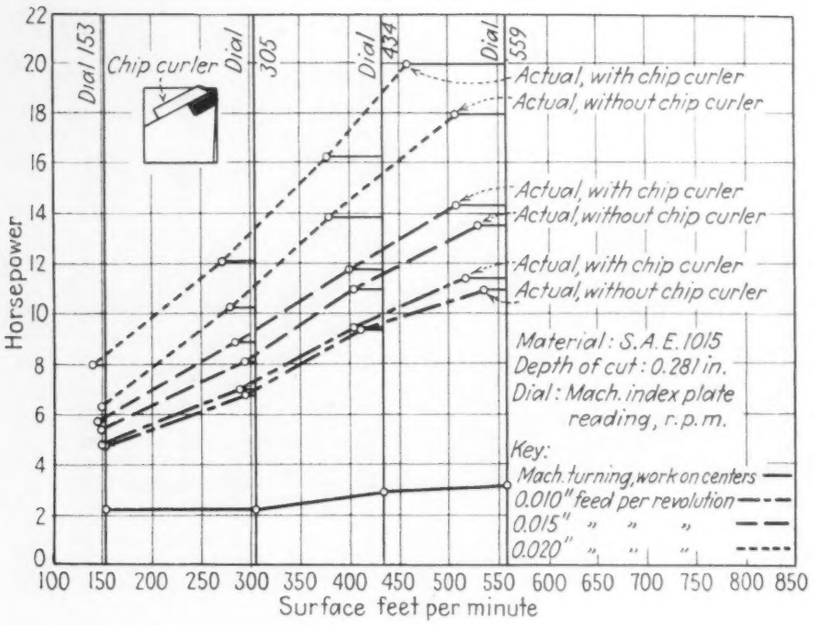


FIG. 2—Chart showing the effect of using a chip curler on the power required to turn SAE 1015 steel at various feeds.

the use of carbide tools will be eliminated.

The results of power failure and stopping of the tools in the cut, in general, are tip breakage and lost production time. Previous to the recent reduction in the price of carbide tips, the cost was an important item. This is secondary today under present prices, but production down-time is important. Unless an operator is furnished with spare or replacement tools to carry on with while a tool that has failed is being repaired, it is paramount that tool failures be held to a minimum.

The effect of cutting angles on power consumption is important also. Perhaps this can best be appreciated by examining the graphs illustrated on subsequent pages. These graphs were charted from many readings taken on the same material and maintaining the same depth of cut throughout the test and with the different cutting angles as shown on the 12 tools. But even when these elements are under control, there are many other variables which influence readings such as those charted, and it may be desirable to elaborate on some of them.

First, unless one has checked the power consumed by turning steel at a speed of 300, 400, or 500 ft. per min., and using a feed of 0.015 in. per rev., he is likely to underestimate the power required. Hence whereas one assumes that he is machining at a surface speed corresponding to the lathe index plate reading, in reality he is getting a much lower actual cutting speed, as will be seen later by a study of the test calibration charts, Fig. 4. In some cases, during the running of the tests in our shop, this slowing down of spindle speed was so noticeable that it was discernable to the eye. This result should immediately make one cautious, for it is indicative of the fact that the motor is being overloaded.

Effect of Chip Curler

Another important variable to check is the performance of and power consumed by mechanical chip curler, such as shown in Fig. 1. This type of curler performs

POWER CONSUMPTION TESTS ON SAE 1015 STEEL

Tool Number	Back Slope	Top Side Rake	SERIES ONE .010 in. Feed per Rev.				SERIES TWO .015 in. Feed per Rev.				SERIES THREE .020 in. Feed per Rev.				SERIES FOUR .025 in. Feed per Rev.			
			Surface Ft. per Min.				Surface Ft. per Min.				Surface Ft. per Min.				Surface Ft. per Min.			
			150	250	350	450	150	250	350	450	150	250	350	450	150	250	350	450
			Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.	Hp.
9	+8°	30°	4.93	5.80	7.77	10.15	6.11	7.18	9.64	11.97	7.42	9.56	12.13	15.76	8.48	10.93	13.83	16.96
10	+8°	25°	4.96	6.40	8.43	10.51	6.35	7.59	9.64	12.76	7.66	9.58	12.33	16.37	8.86	11.30	13.67	17.93
1	+8°	12°	5.70	7.34	9.21	10.43	6.99	8.56	11.29	13.22	8.79	10.90	14.68	16.35	9.54	12.76	18.03	20.17
11	+3°	15°	5.31	7.18	8.71	11.75	6.82	8.11	10.72	14.43	7.88	10.27	13.16	16.96	9.24	12.09	14.86	19.34
12	0°	30°	4.96	6.27	7.77	9.49	6.36	7.44	9.33	11.25	7.64	9.23	11.35	13.89	8.90	10.56	12.75	15.74
3	0°	12°	6.01	7.42	8.94	11.65	6.91	8.71	10.76	14.09	8.18	11.03	13.32	16.94	9.72	13.02	15.53	18.82
2	−6°	14°	6.57	7.55	9.21	10.35	7.51	8.63	11.61	12.87	9.24	11.41	14.43	16.81	10.85	13.29	16.62	20.34
4	−15°	11°	6.69	7.71	9.41	11.98	7.57	9.29	11.18	14.32	8.79	11.61	14.43	18.26	10.51	13.84	17.72	20.74
6	−20°	15°	5.86	7.21	9.91	11.41	7.27	8.90	12.02	13.81	8.11	11.43	15.55	18.02	8.48	13.51	17.72	20.53
5	−20°	20°	5.91	7.56	9.10	11.21	6.66	8.78	11.34	13.69	8.11	11.41	14.30	17.26	8.56	13.63	17.26	20.63
8	−20°	25°	5.12	6.46	8.86	10.17	6.91	8.32	10.62	12.39	8.63	10.79	13.27	16.81	9.54	12.94	16.49	19.64
7	−25°	30°	5.40	6.91	8.67	9.77	6.97	8.40	10.57	12.00	8.18	10.26	13.06	16.29	9.54	12.44	16.49	18.70

7/32 in. depth of cut, held constant throughout test.

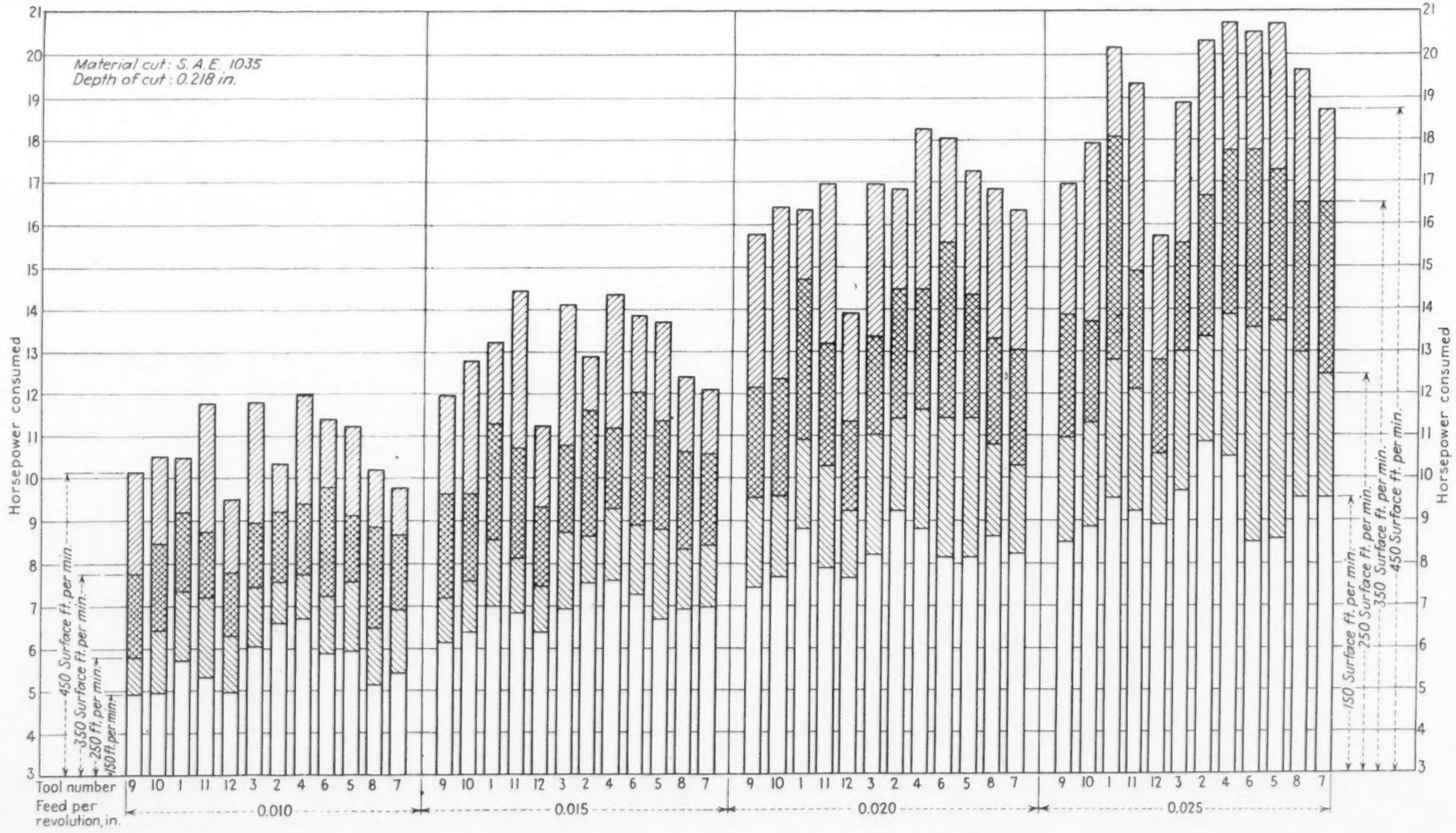
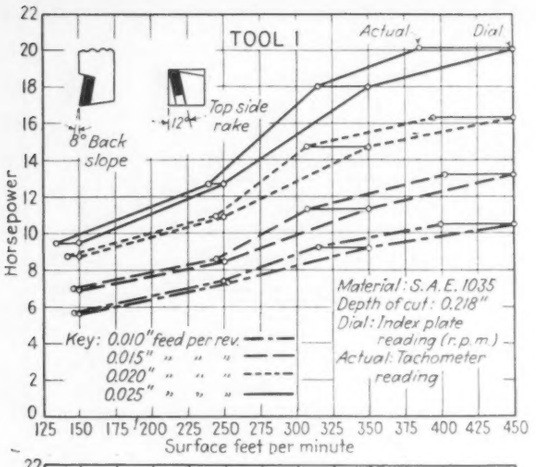
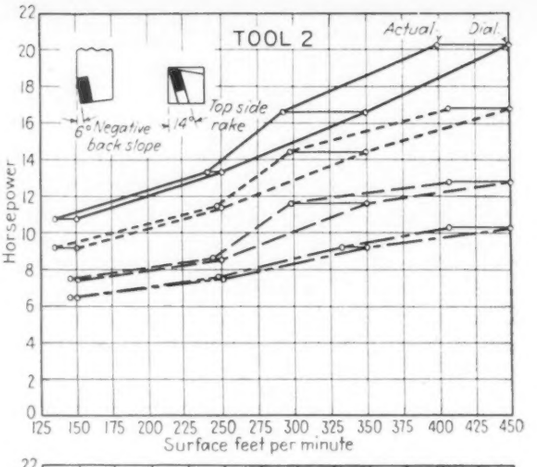
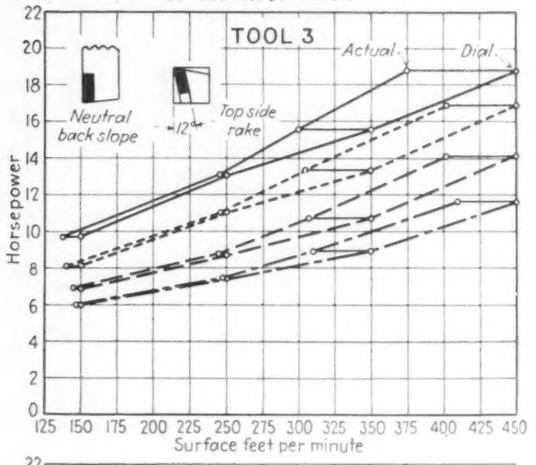
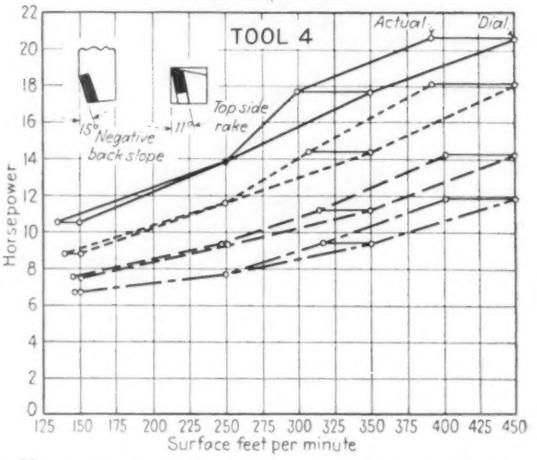


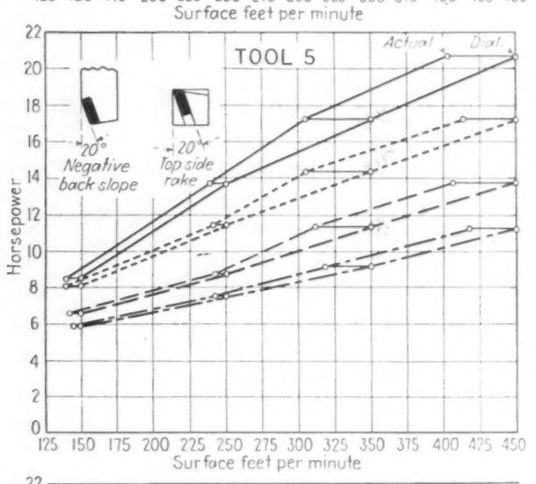
FIG. 3—Power required to turn SAE 1035 steel with 12 styles of tools and four different feeds and nominal cutting speeds. Data plotted are given in accompanying table on facing page.

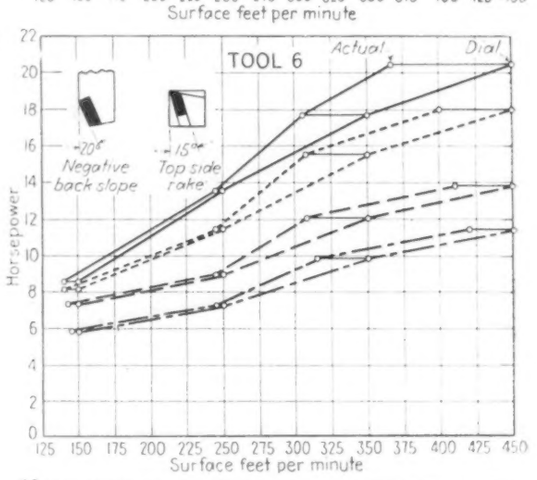

TOOL 1
Actual
Dial
8° Back slope
+12° Top side rake
Material: S.A.E. 1035
Depth of cut: 0.218"
Dial: Index plate reading (r.p.m.)
Actual: Tachometer reading
Key: 0.010" feed per rev.
0.015" " " "
0.020" " " "
0.025" " " "
Horsepower
Surface feet per minute

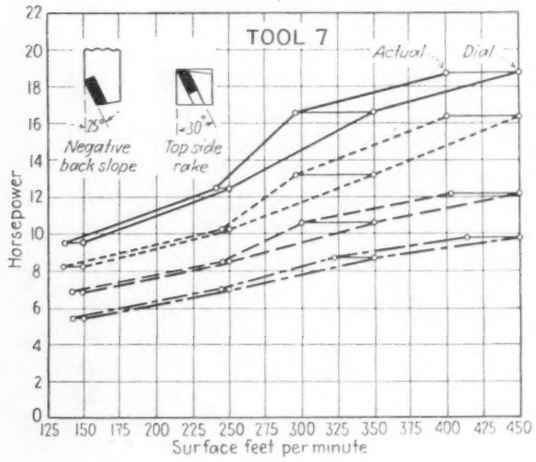

TOOL 2
Actual
Dial
6° Negative back slope
+14° Top side rake
Horsepower
Surface feet per minute

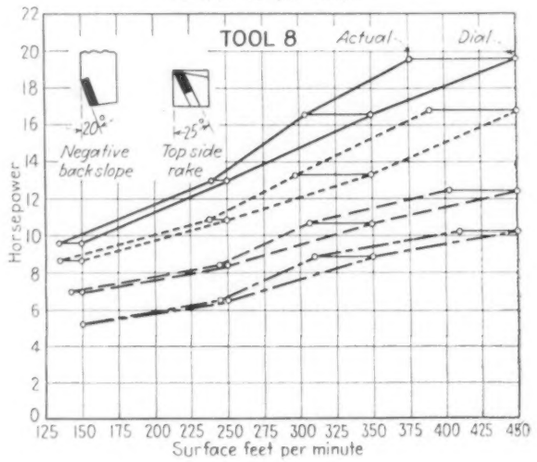

TOOL 3
Actual
Dial
Neutral back slope
+12° Top side rake
Horsepower
Surface feet per minute


TOOL 4
Actual
Dial
15° Negative back slope
+11° Top side rake
Horsepower
Surface feet per minute


TOOL 5
Actual
Dial
20° Negative back slope
+20° Top side rake
Horsepower
Surface feet per minute


TOOL 6
Actual
Dial
20° Negative back slope
+15° Top side rake
Horsepower
Surface feet per minute


TOOL 7
Actual
Dial
25° Negative back slope
+30° Top side rake
Horsepower
Surface feet per minute


TOOL 8
Actual
Dial
20° Negative back slope
+25° Top side rake
Horsepower
Surface feet per minute

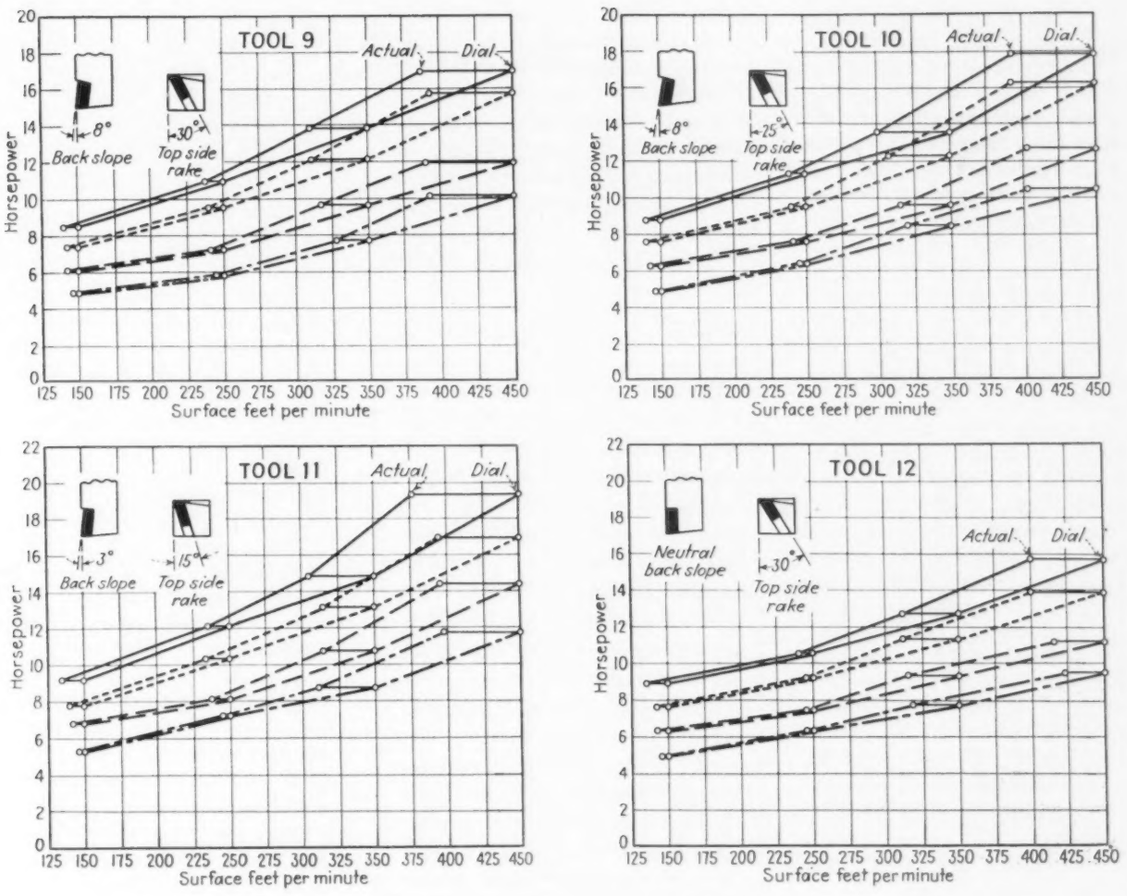


FIG. 4—Calibration charts of actual vs. nominal dial setting speeds for each of the 12 tools under observation in the tests. Key identifying the four feed rates used is given on chart for tool No. 1.

very well and is easily adjusted by the end screws in the top clamp piece. In our plant, we prefer the mechanical or adjustable chip curler to the ground-in type, for experience has taught us that varying feeds require a different adjustment of curler. A tool with mechanical curler which performs remarkably well at 0.010 in. feed per rev. is reasonably sure to chatter badly at 0.020 in. feed per rev., and if the power consumed were checked, it would be noticed that considerably more power is required than when the chip curler is adjusted properly and the chips roll off in an easy flow. Variations in power consumption can also be noted in the sound of the machine, for an experienced operator can easily distinguish whether the machine is laboring unusually hard or performing normally.

Fig. 2 shows clearly the effect of chip curling on power input. This graph, although not used in the readings as charted in Fig. 3, does show what the power consumed is in curling the chip, and should make one conscious of the necessity of a correct adjustment of the chip curler. Our experience has shown that the spacing of the chip curler varies from 1/16 in. from cutting edge using a 0.010-in. feed per rev., to 3/16 in. for a 0.030-in. feed. This range is for low carbon or free cutting steels and is not necessarily true for the tougher alloys. Experimentation is required here to determine the spacing that will produce the best results.

Another variable is the keenness of the cutting edge. It is important to keep the cutting edges sharp, inasmuch as one, in order to make use of the cutting speeds possible with carbide tools, is likely to work the motor at full rated capacity, and any unnecessary load or pull on the motor is adding both a hazard to tool life and also the danger of a damaged motor in case the machine is run for any extended period.

In order to determine the proper cutting angles for use in our shop, much thought was given to how to arrive at a proper selection. We experienced considerable tool loss at the inception of carbide application on steel turning. To eliminate this excessive breakage and to obtain maximum efficiency when we made extensive use of carbides on steel turning, we decided to investigate the effects of greater rake angles, more nearly approaching those used on high speed steels, even though they were considered hazardous to carbide tool life. These angles included negative, neutral and positive top slopes in conjunction with top side rake. Negative top slope has long been recognized as desirable on high speed steel and tungsten carbides for cast-iron turning, so we were determined to see what the effect would be of these rake and slope angles on steel turning grades of carbides. Where the general recommendation has been, for some time past, the use of 6 to 15 deg. top side rake angles (and there are many today who still use these

angles), we were not satisfied with the performance that these angles gave. The measuring of the power consumption under various feeds, speeds, and combinations of tool angles was our answer to this question. We studied the effects of various side rake and top slope angles on power consumption with different feeds and speeds, maintaining the same depth of cut and using the same material in our tests.

As mentioned previously, the graphs shown on Fig. 3 summarize the results. These data are also presented in the table. We ran these tests on different occasions, and whereas we noticed that the horsepower input varies slightly each time for the same tools, still the general performance repeats itself each time, namely, that certain angles or combinations of angles give decidedly better performance both in horsepower and in economical tool life. We ran four series of tests, each using a different feed. The 12 tools in each series represents 12 different tool grinds or combinations of cutting angles with respect to top side rake and top slope.

These tool styles, numbered from 1 to 12, are shown on the various calibration charts presented as a group in Fig. 4. It will be noted in the bar chart, Fig. 3, that power consumption data for the 12 tools are grouped for four different feeds of 0.010, 0.015, 0.020 and 0.025 in. per rev. and for each feed power consumption at four different cutting speeds is given. It should be noted, however, that these cutting speeds of 150, 250, 350 and 450 ft. per min. are nominal in that they represent the readings taken with the work on center but not under load. The purpose of presenting the calibration charts in Fig. 4 is to show for each tool and for every feed condition the actual surface speed in feet per minute corresponding to the nominal dial setting on the lathe. The difference between the dial indicated speed and the actual tachometer checked speed is accounted for by electrical slip in the motor itself, belt slip and slip in clutches under heavy load.

Incidentally, the general condition mentioned above should be taken into account by timestudy men and rate setters, as it is obvious that speeds are not what the dial setting would indicate. Furthermore, machine tool builders would do well to take note of the appreciable horsepowers required for cutting steel with carbides at high speeds.

The results of these tests convinced us that we could very definitely choose the proper angles for turning steels up to 0.40 per cent carbon. Before accepting any angles as final, however, regardless of the fact that they might have consumed less power, we proved out the cutting life of the best grinds by keeping a close record of tool performance between grinds. When we found that we could turn 2000 lineal inches or more in the direction of feed with these angles, we were satisfied to accept them as economical for use. We do not mean to state that we always get this life performance, but we have used these angles for hours without regrinding. We are equally frank to state that these tools sometimes turn only a few inches before regrinding is necessary. These bad performing tools are not due to grinding angles—rather it is because of faulty workmanship, faulty carbide, or carelessness of the operator, all faults on which the angles have no bearing.

TESTS made on the power consumption of carbide tipped tools with 12 different combinations of cutting angles when cutting SAE 1035 steel lead the author to the conclusion that a large top side rake angle (30 deg.) is beneficial from several viewpoints and that zero or even negative back slope does not increase power materially and may even be desirable for certain types of cutting. Other important conclusions reached on the basis of this intensive study are that cutting steel with carbides at high speeds consumes more power than is usually estimated, that tool loads slow the spindle considerably below the dial set, free running speed and that an appreciable amount of power is required to "curl" chips.

The three tools that we chose as outstanding in performance are:

No. 7 with 25 deg. negative front slope, 30 deg. top side rake angle.

No. 9 with 8 deg. positive back slope, 30 deg. top side rake angle.

No. 12 with neutral back slope, 30 deg. top side rake angle.

Tool No. 7, for high speed turning, has decided disadvantages, however. When turning steel and using a 3/16 to 7/32-in. depth of cut, the negative front slope has a tendency to push the bar being turned away from the tool with the result that when the feed is thrown off, the bar springs back, thereby cutting a groove in the bar which will not grind out in case grinding stock is left on a diameter for fine finish. In case the bar is being turned to exact size, a groove is undesirable.

Tool No. 9, with positive back slope, likewise has a tendency to pull in the bar toward the tool or the bar to climb on tool. This, too, is a condition which is not desirable.

Tool No. 12 is the tool we chose for the best performance, for it seemed to have neither the fault of crowding away from the bar, nor that of pulling the bar toward it. Of course, there will be some deflection of the bar while it is being turned, but for all-around performance, this grind, or use of 30 deg top side rake angle and neutral or zero back slope, will be found to be as nearly ideal for use as will any combination of angles we have yet discovered. The negative back slope is desirable on steel casting work or where heavy feeds and slower speeds are used inasmuch as it puts the cutting edge in compression instead of shear.

For turning higher alloy steels and heat treated steels of high Brinnell readings, we use a 15-deg. top side slope angle, and this gives us good tool life. For the turning of hard surfaces or wear-resisting alloys, we frequently use a negative top side angle with small clearance angles. This gives us the desired tool life. For bar steel turning, where we use speeds of from 300 to 600 surface ft. per min., we find a copious flow of soluble oil to be a good coolant.

Conclusions Reached

The conclusions reached from our tests are: First, that we could

standardize on large side rake angles, thereby reducing power consumption and also tool breakage; second, that negative back slope does not increase power consumption considerably—as has long been the accepted theory in the field at large; third, that power consumption does not increase in direct proportion to the increase in feed and speed. This last conclusion is borne out, as indicated in the table, by the compilation of horsepower input for the various combinations of angles used in the tests of the 12 tools which are shown in Figs. 3 and 4. It should be noted that on the tool views shown on these graphs, Fig. 4, no attempt was made to show tool construction, but merely to give a graphical representation of the principal cutting angles used. In the table we have grouped the tools having positive back slope, those having neutral back slope, and those having negative back slope. The figures given clearly indicate that with an increase of 200 per cent in speed, using the same feed, there is an average power increase of only approximately 100 per cent, or using the same speed and increasing the feed 150 per cent, an increase in power input of approximately 79 per cent.

Our fourth conclusion is that the larger top side rake angles cause considerably less downward cutting pressure on the tip and thereby reduce the hazard of tool failure in spite of the fact that the included angle at the cutting edge is smaller. This lower downward pressure, together with the decreased power consumption makes it a desirable combination worthy of consideration. It should be remembered, however, that such angles are not recommended for tough alloys or high carbon steels.

A simple way which has proven effective in increasing the life of the larger top side rake angles is to grind a secondary angle of a few thousandths of an inch in width on the cutting edge. This will give considerably more strength to the cutting edge. From experience, we have found that a secondary grind width of 40 to 50 per cent of the feed per revolution is satisfactory. This modification may cause a slight increase in power consumed, but the increase is negligible. This construction is shown on Fig. 5.

A design of tool which has shown good results in our plant is shown on Fig. 6. There are many who may not approve of this design, but our theory is that a spring tool of the type shown has the distinct advantage of confining the carbide brazing strains locally or in nose section of tool. Also when a sudden load is applied to the tip, if spring is properly designed it will permit the tool to deflect, cushioning the shock on tool tips. Of the hundreds of spring shank tools we have made during the past few years, we have had only two failures in shanks: One due to work coming out of chuck, and the other due to clamping tool past screw over split and displacing the metal at this point. This malpractice caused a fatigue crack and eventually the tool broke off at the split.

It can be noted in Figs. 5 and 6 that we do not attempt to anchor the tip with a braze on three sides as is common practice today. Our thought is that with the different coefficients of expansion for the shank steel, the brazing material and the carbide tip, it is better to leave the ends free, but backed up slightly on the rear end with brazing. This mounting has the advantage also of cutting the machining cost in making the tools as it eliminates the task of fitting tip to corner and also wasting of material lost through the radius on back of tip. The total area or weight of this wastage on 2000 tools is quite an item.

In concluding, the writer wishes to state that there may be some discrepancies found in some of the readings as charted. These variations are hard to avoid or control, considering tool edge, motor efficiency characteristics for variable speed motors, line voltage fluctuation, fluctuating hands on meters under load, and the effect of chip curling as described. These variables are ever present in the shop and repetitive tests may show slight variations in power input, but the constant performance of certain combinations of angles is worthy of consideration for those who have many tools at work at one time in a plant.

What is true for carbide tools, it would seem, may also be true for use on high speed tools, and all the factors mentioned would be worth investigating.

FIG 5—(Below) Grinding of a secondary angle is a method frequently used to strengthen the cutting edge of a steel cutting carbide tip. The recommended width of flat is 30 to 40 per cent of the feed expressed in inches per rev.

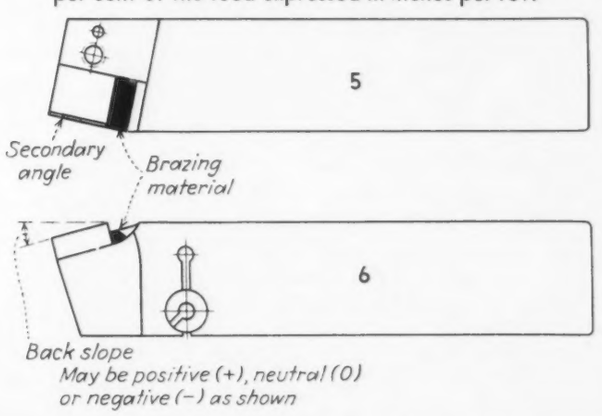
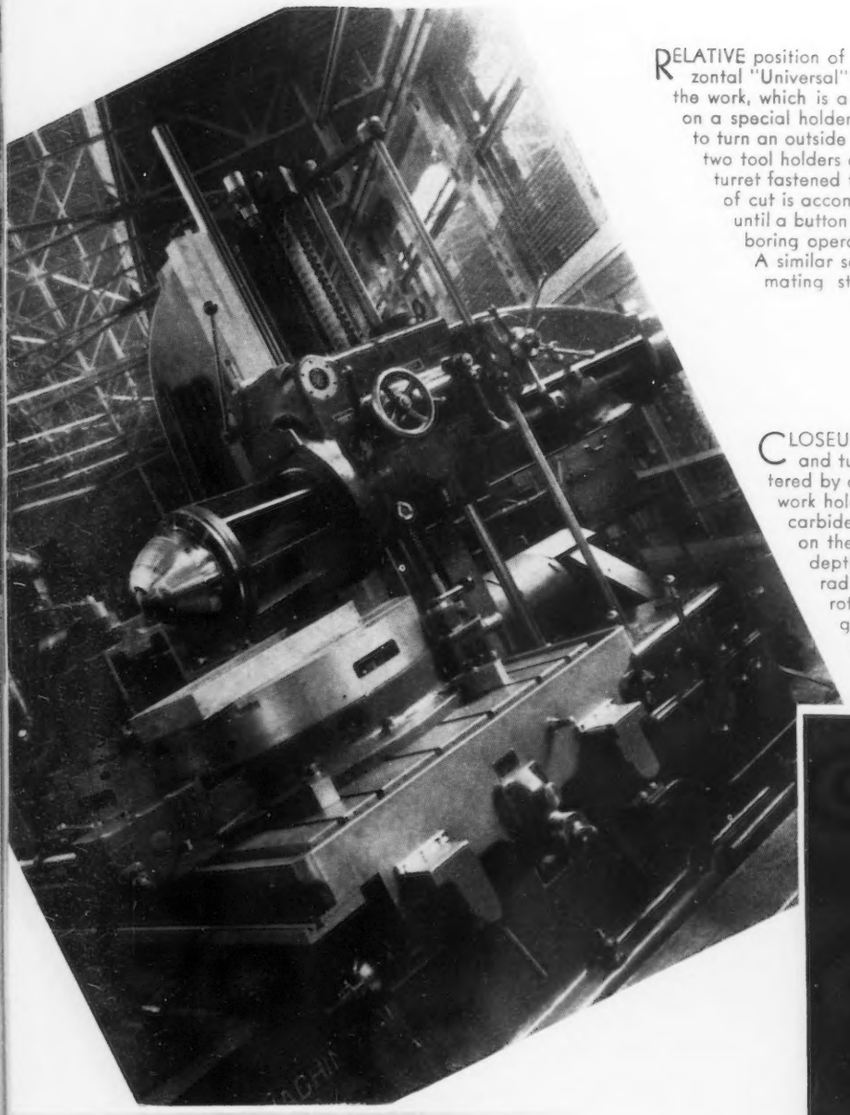


FIG. 6—Breakage of carbide tips due to shock loads can be greatly lessened through the use of a spring type shank like the one shown, which has a fine service record in the shop.

Machine Tools for



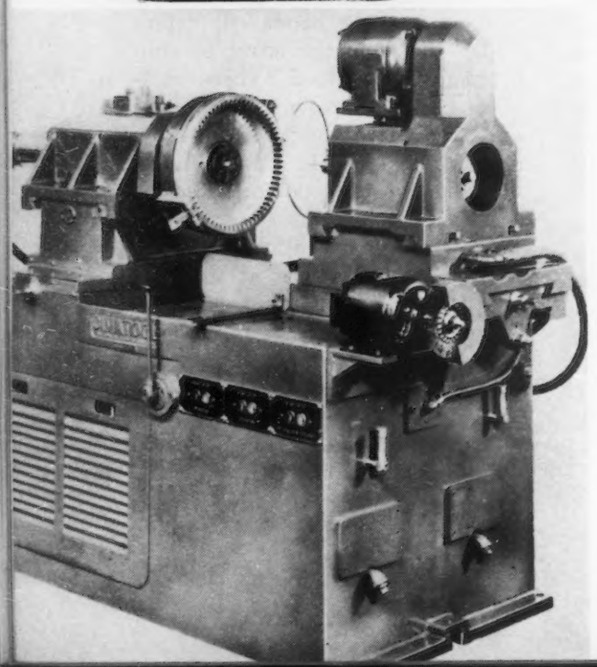
LEFT

RELATIVE position of tools and work is reversed in this special 4-in. spindle horizontal "Universal" boring machine installed at the Watertown Arsenal. Here, the work, which is a semi-spherical levelling bowl for a gun mount, is mounted on a special holder fastened to the rotating machine spindle. Operations are to turn an outside spherical surface and bore an inside spherical surface. The two tool holders are mounted in the plane of the centerline of the work on a turret fastened to a power driven rotary table. Feeding of the tool to depth of cut is accomplished by power traverse of the saddle toward the column until a button hits an indicator gage, out of sight in this view. The spherical boring operation is handled in a similar manner and is performed first. A similar set-up is also employed for boring the spherical seat on the mating steel sockets and turning the seat of clamping member

o o o

BELOW

CLOSEUP view of the special turret tool head for spherical boring and turning operations on a "Universal" boring mill. Work is centered by a shoulder inside the flange, which is bolted to the extended work holder. Material cut is a manganese bronze and both tools are carbide tipped, maximum cutting speed being about 400 ft. per min. on the largest diameter. When the saddle is brought up into full depth of feed, it is necessary that the cutters be at the correct radius from the center of generation, which is the axis of the rotary table. Proper setting of tools is assured by template gages. The template for the boring tool is set over the two projecting pins seen just to the right of the turret clamp post. Index location of the turret is fixed by a lock bar and slot on the under side.



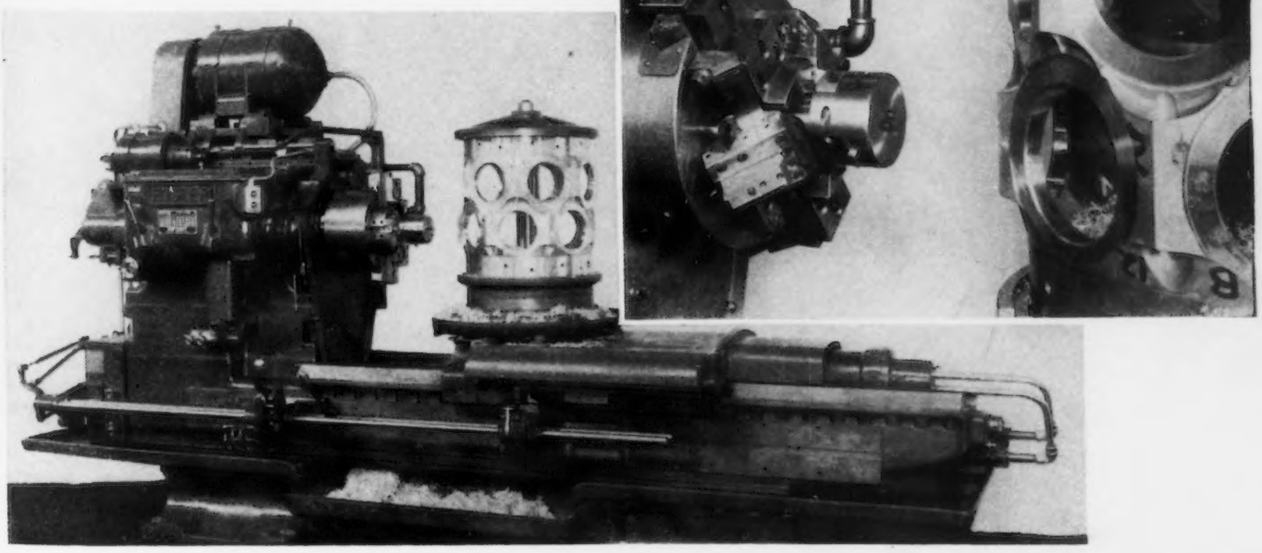
LEFT

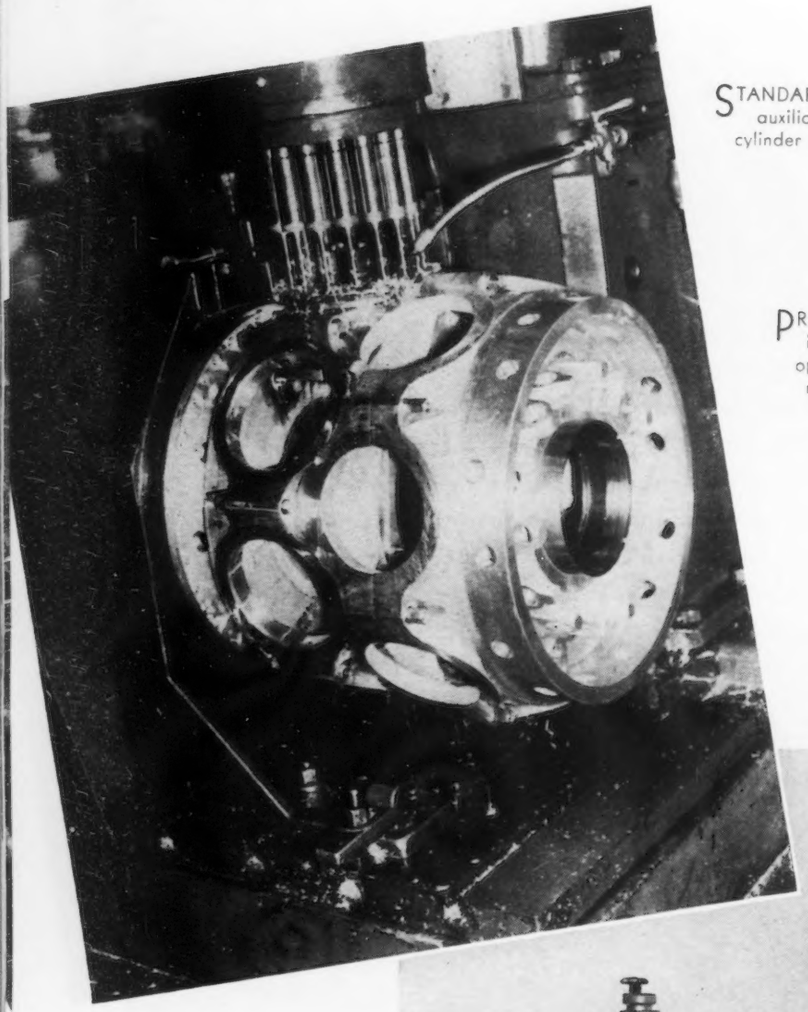
THIS Cimatool contour burring machine, No. 201-A, was produced primarily for burring the sharp edges of teeth on reduction gears of airplane propellers. It can burr the front and back faces of both internal and external gears along their involute form, taking the place of grinding or hand operation for such work. The gear to be burred is rotated by worm and gear drive and at the same time a cam imparts a transverse movement to the work, the combined movement causing the cutter to follow the involute curve and top and root of the gear tooth face. In order that the tool will follow the face angle of the gear tooth, a second cam is placed on the main workhead driveshaft, thereby feeding the work away from and toward the cutter on a line parallel to centerline of the cutter spindle. The cutter, locked in a high speed precision type of ball bearing spindle, is automatically moved into position after the operation cycle is started.

Defense . . .

ON these and following pages are presented pictorially a large variety of special machine tools and special tooling set-ups on standard machines that resourceful machinery builders and tool engineers have devised to meet new and unfamiliar production problems posed by the demands of the national defense program. Because the aircraft industry was the first to feel the impetus of war demands, a large amount of this special tooling necessarily relates to aircraft production. Within the last six months, however, increasing attention has been paid to shell manufacture and to the production of guns and tanks, creating new problems and new answers. The pictures are roughly grouped in alphabetical order according to the operation title, beginning with boring operations and ending with turning operations on shell and aircraft parts. The series will be continued in a later issue.

COMBINATION boring and facing operations are being performed on this 14-cylinder radial aircraft engine crankcase on this specially fitted 4-F universal turret type Fastermatic. Unconventionally, the work is mounted on the turret slide and is at first rapid advanced and then fed at the feeding rate for the rough and finish boring operation. Then the forward ram movement is positively stopped and immediately the rough and finish facing operations are started. With this operation, a chamfer is generated and a clearance groove is formed at the outer edge of the pad. After one pad is finished, the work rapid reverses and is indexed to the position for boring the next pad. All seven pads are completed automatically. The second row of pads require changing the case, end for end. After all pads are completed, another locating ring is placed on the indexing fixture and a cavity is automatically formed adjacent to each hole. The enlarged view shows the boring head and facing tool slide, which is hydraulically operated from a cylinder on the rear of the machine. With an experienced operator, the operations on the two rows of holes can be completed in approximately 1¾ hr., and one operator can easily handle three machines. These Fastermatics are built by the Foster Division, International Machine Tool Corp., Elkhart, Ind.



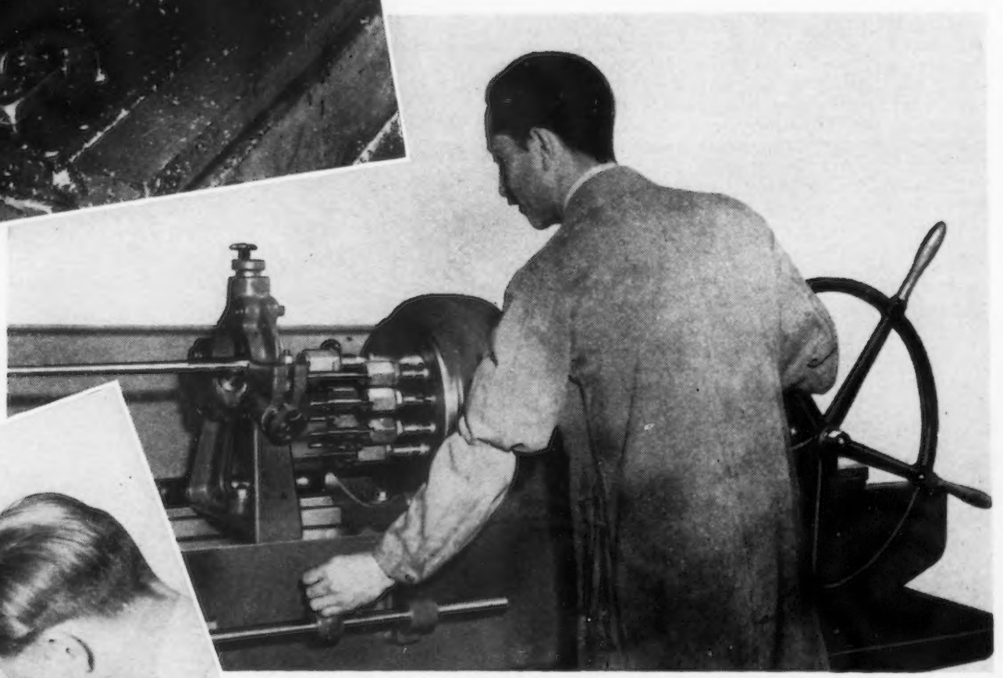


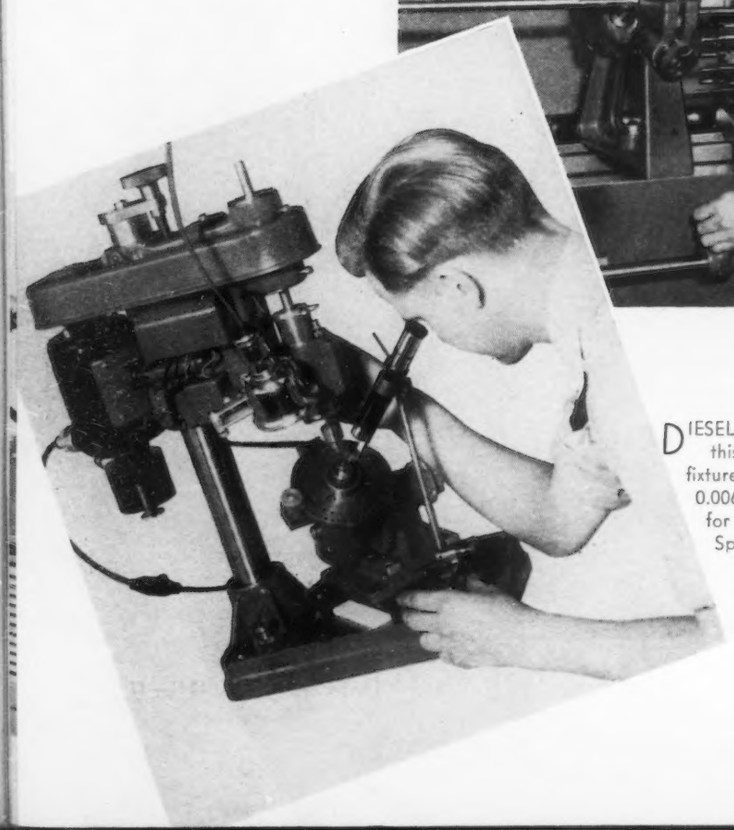
LEFT

STANDARD Barnes drilling machine equipped with a 16-spindle auxiliary head and a special indexing fixture for drilling a series of cylinder pad stud holes in the crankcase of a double-row radial aircraft engine.

BELOW

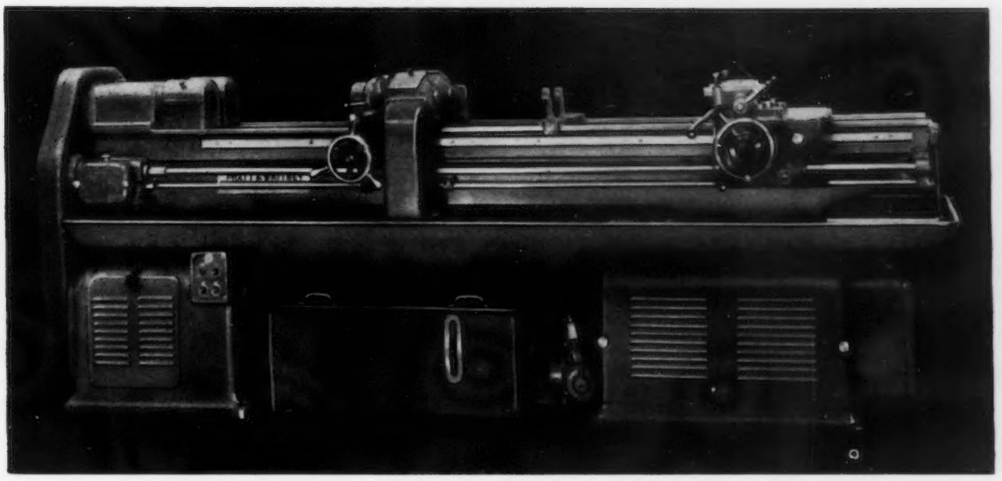
PRATT & WHITNEY'S No. 1/2B gun barrel chambering machine is a modern production unit designed to perform the various operations in the butt end of a previously drilled, reamed and rifled gun to form the cartridge chamber. The gun barrel is held at one end by a collet chuck and is driven by power at variable speeds. Its outer end is supported in an adjustable steadyrest with spring operated jaws allowing the barrel to float to overcome eccentricity. The turret of the machine, illustrated, contains 10 tool spindles, each fitted with a tool adapter which incorporates an adjustable feed depth stop. Feed of the tools is by the large capstan wheel at the right. The uppermost spindle is the working one, and upon withdrawal of the turret, indexing takes place. A device automatically engages the correct work spindle speed as each tool spindle is brought into place. Cutting oil is fed through the gun barrel.





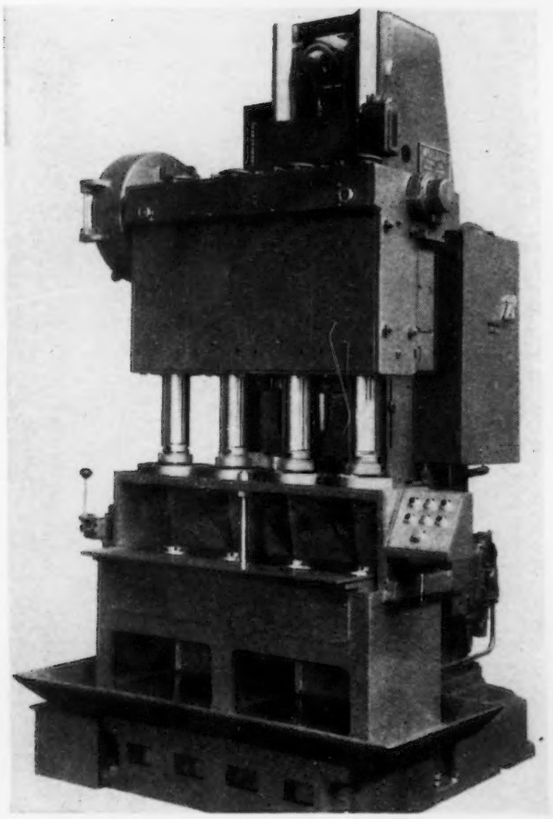
LEFT

DIESEL engine fuel injection nozzles call for precise drilling of small holes. In this Taylor Hi-Eff series A drilling machine equipped with a special indexing fixture, the workman is drilling six holes at the specified angle by means of an 0.006 in. diameter drill. Spindle speed is 4500 r.p.m. A microscope is needed for this fine work. Combined runout of spindle and chuck is held to 0.0001 in. Spindle is completely counterbalanced so that the operator readily feels the bite of the drill.



ABOVE

WHEN drilling deep holes in gun barrels and the like with the Pratt & Whitney machine illustrated, the single flute drill remains stationary while the work is revolved around it. This special type of drill has a hole throughout its length which carries high pressure oil. The oil blows the chips away from the cutting edge and out through an external flute along the drill. The machine is a duplex type and separate motors drive each spindle. An adjustable automatic safety knock-off stops the machine when overloads are encountered from dull drills or hard spots. These machines are made in drill capacities from 3/16 to 1 in. diameter and from 30 to 74 in. drilling length.



ABOVE

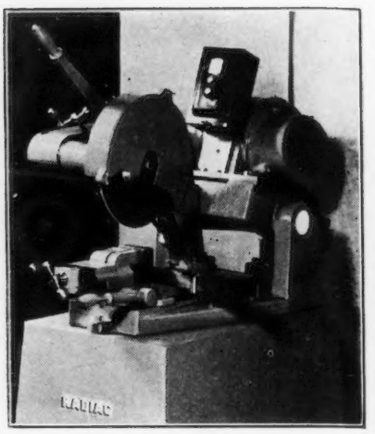
FOUR steel liners for aircraft engine cylinders are semi-finish bored in this special Moline No. 115 CB machine. Following this operation precision or fine boring is done on a modified version of this machine, model No. 116 FB, using automatic retracting boring heads in which are mounted single point cemented carbide tool bits. Both machines have electric push button controlled feed cycles and both have fixtures with hydraulically actuated clamping mechanism. The clamping on the machine shown is controlled by a hand operated valve, while for the finish boring operation, clamping is controlled by push button and unclamping is automatic at the completion of the operating cycle.

BELOW

WALKER-TURNER flexible shaft equipment being used in an aircraft engine plant for burring teeth on internal ring gear. Behind the cast iron housing over the four step V-pulleys is the 1/2-hp. driving motor operating at 3450 r.p.m. Spindle speed is 8000 r.p.m. Work is mounted on simple, friction type hand indexing fixture, presenting gear axis at convenient angle for reaching back sides of teeth.

RIGHT

ESPECIALLY useful for cutting off chrome molybdenum steel tubing in the aircraft industry and widely used in arsenals and navy yards also, is this new type M Radiac cut-off machine, made by A. P. de Sanno & Son, Inc. Sufficient power to cut off 2 in. tubing with a 12 in. wheel is obtained through five V-belts from a 5-hp., 3600-r.p.m. motor, spindle speed being 5200 r.p.m. Work is clamped by spring tension jaws, the opening and closing of which are attained by a screw and ball crank handle. A quick acting lever releases the stock after it has been cut. Either a straight or swivel vise is available.

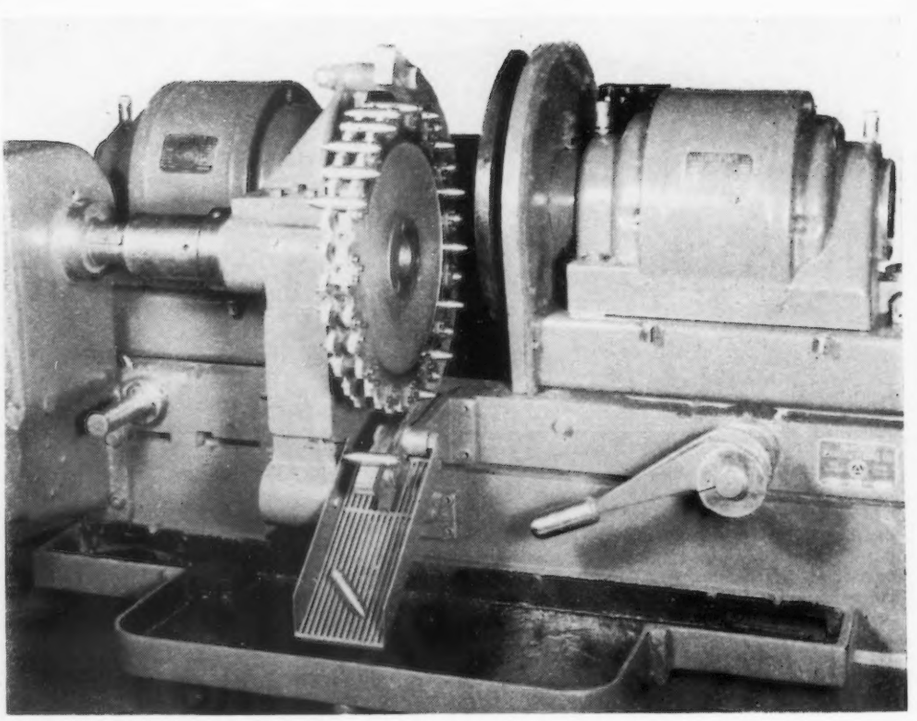


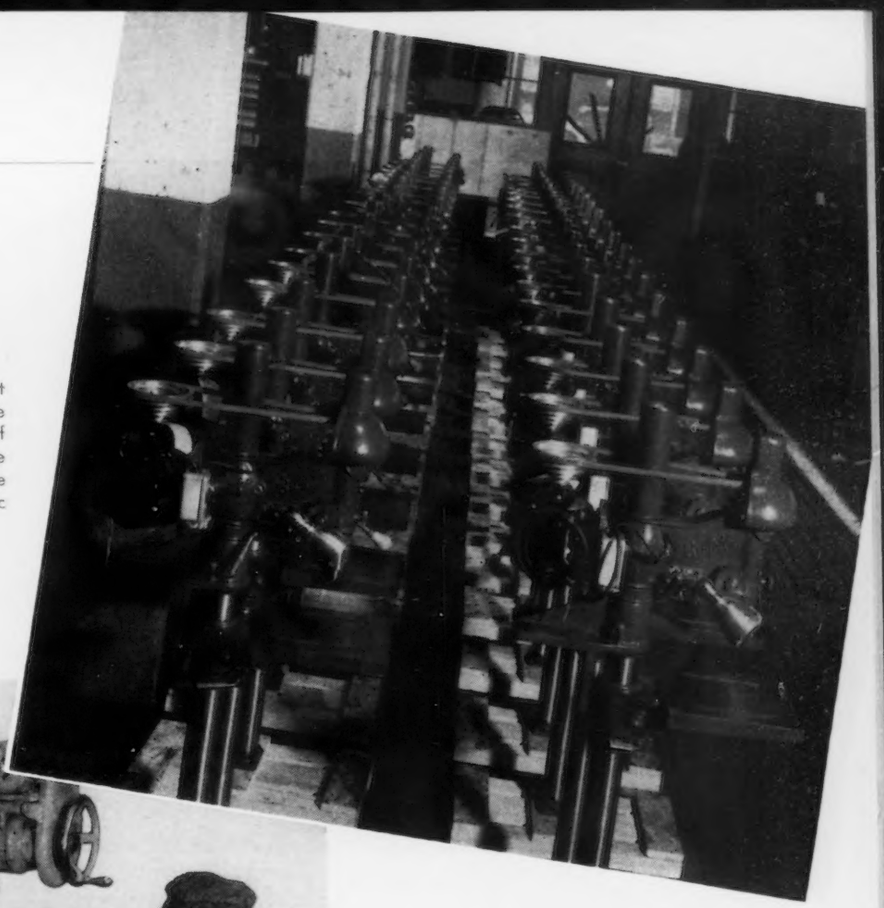
LEFT

ALUMINUM alloy wing stiffeners are corrugated from long wide sheets in this 130 series Cincinnati all-steel press brake, shown installed at the Boeing Aircraft plant, Seattle.

RIGHT

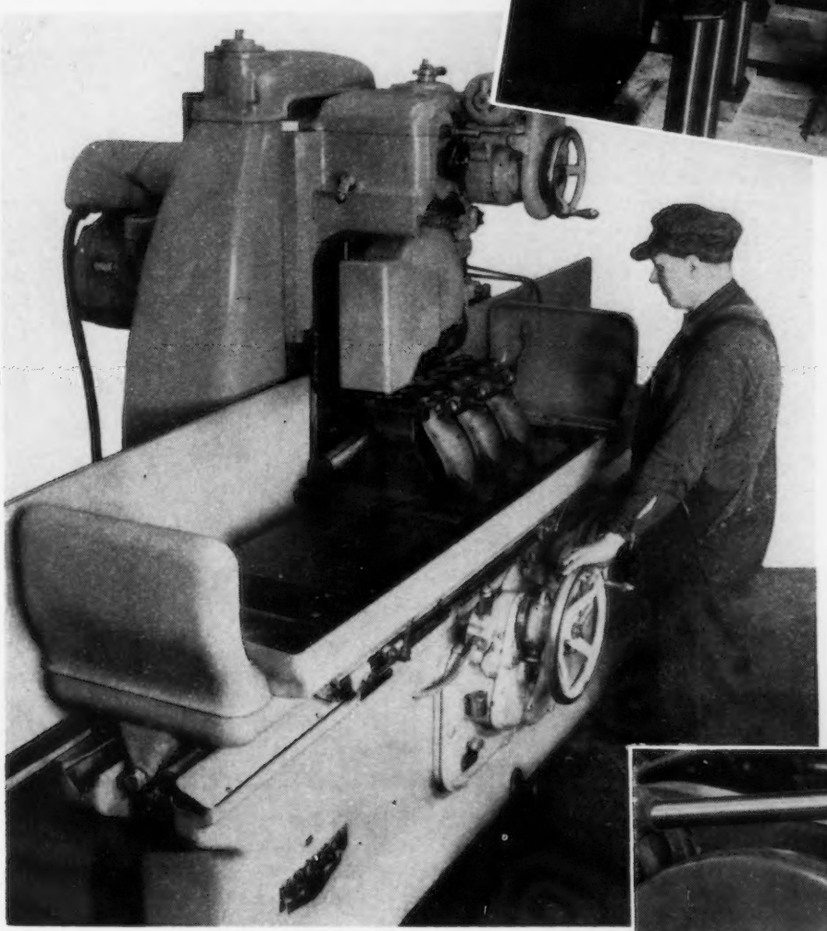
GRINDING of the ends of 20 mm. shell blanks is performed semi-automatically in the No. 220 Hanchett Badger opposed-disk grinder illustrated. The blanks are centered by hand in the V-stations of the rotary fixture as it continuously revolves and are carried under a circular, tensioned band which holds them solidly while they are between the wheels. As the shells near the bottom of the drum's revolution, they are released from the band pressure and roll down the chute. Length from the groove near the square end of the shell to the tapered flat tip can be held within 0.002 in. with ease. Production is continuous and as many as 2400 blanks can be finished in an hour.





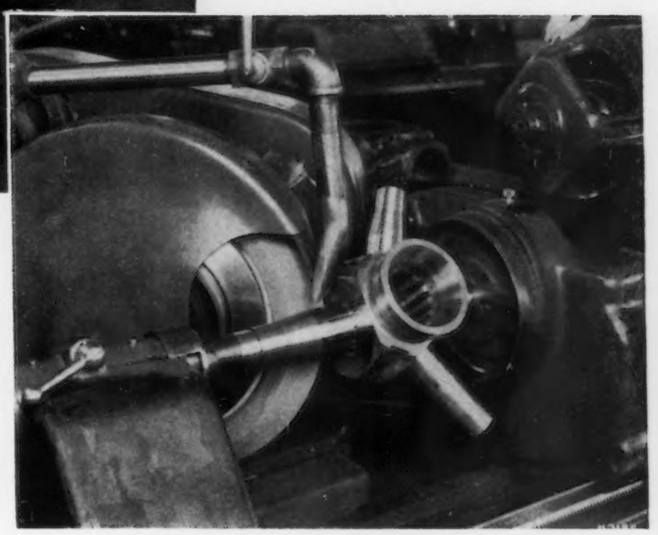
BELOW

GRINDING exhaust manifold parts at Curtiss-Wright on a Mattison high powered precision surface grinder. Magnetic chuck is 14 x 48 in. and both sides of the steel manifold parts are finish ground to a tolerance of 0.0002 in., with a stock removal of 0.002 in. Spindle motor is 15 hp., with a 3-hp. motor driving the hydraulic pump for table feed and wheel cross traverse.



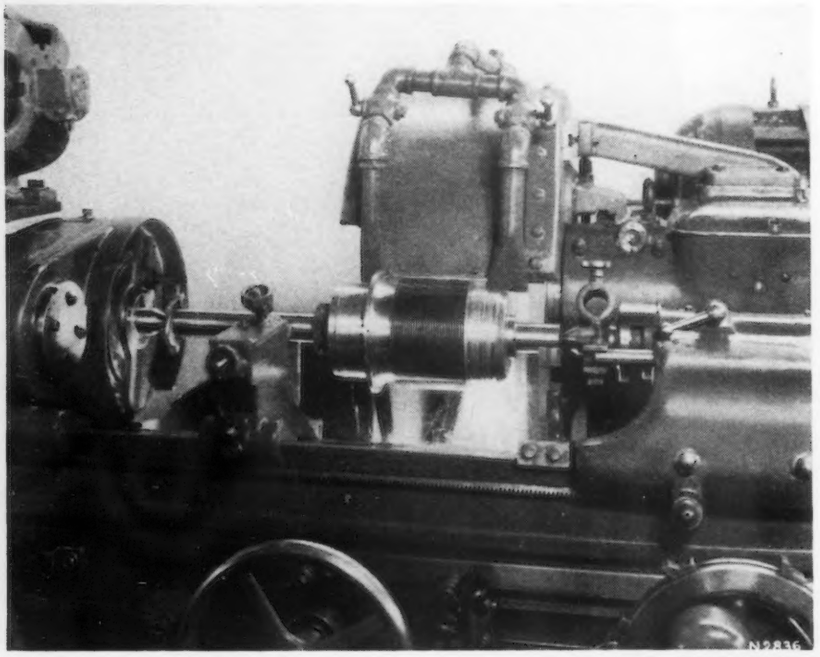
ABOVE

BATTERY of Buffalo sensitive drills for use in mobile repair units of the Ordnance Division of the U. S. Army



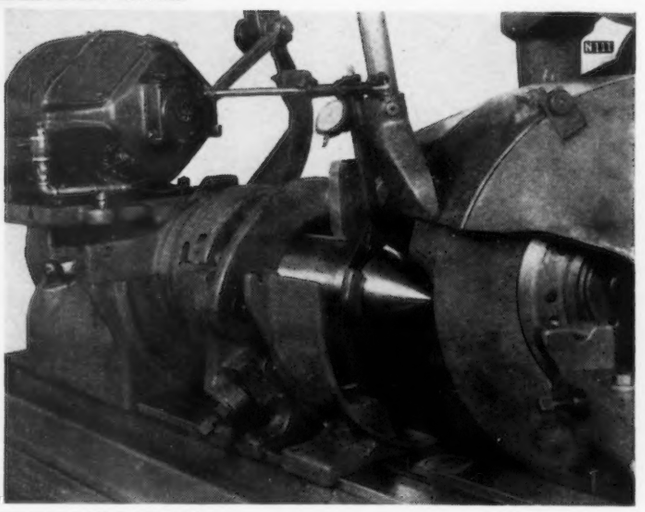
RIGHT

THE adjustable blade propeller is distinctly an American achievement and the mechanism to accomplish the desired results must be very accurately made. In grinding the spider arm bearings of propeller hubs, fine finish on the flange with the grain lines running concentrically is important. Only a machine of the angular wheel slide type, such as this Norton unit, can produce such a finish simultaneously on both the diameter and the shoulder. In some hub designs, a definite fillet is called for between the shoulder and the diameter. This is produced by a radial truing device. Set-up is simple since hub is rotated between centers during grinding.



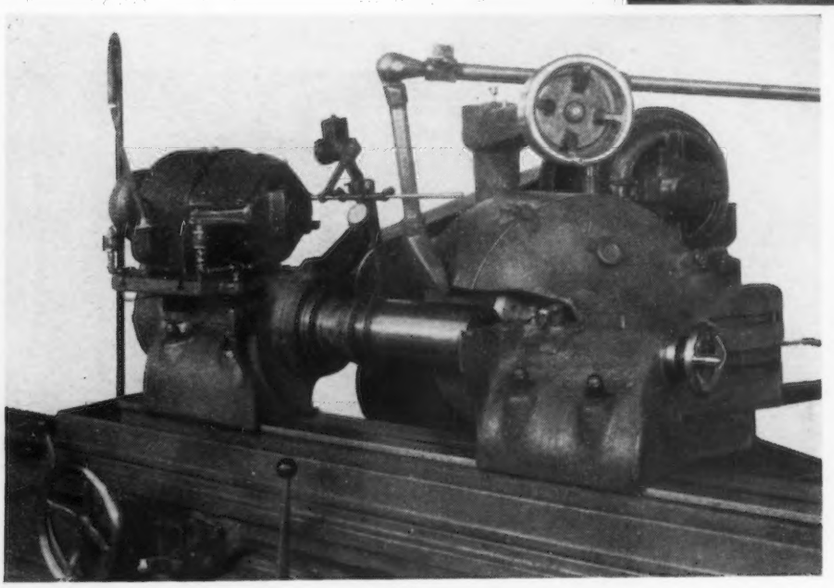
LEFT

THIS heavy duty 14-in. Norton cylindrical grinder is shown equipped with three wheels for grinding cylinder barrels for radial type aircraft engines. The cylinder barrel is mounted on an arbor and three diameters ground, after which the wheel slide is retraced by means of a rapid power traverse mechanism. Then the table is moved to the right and the wheel head advanced again. The narrow diameter at the extreme left of the barrel is then ground with the narrow right-hand wheel. A multi-stop index is employed which, once set, permits the grinding of successive different diameters with the same wheel.



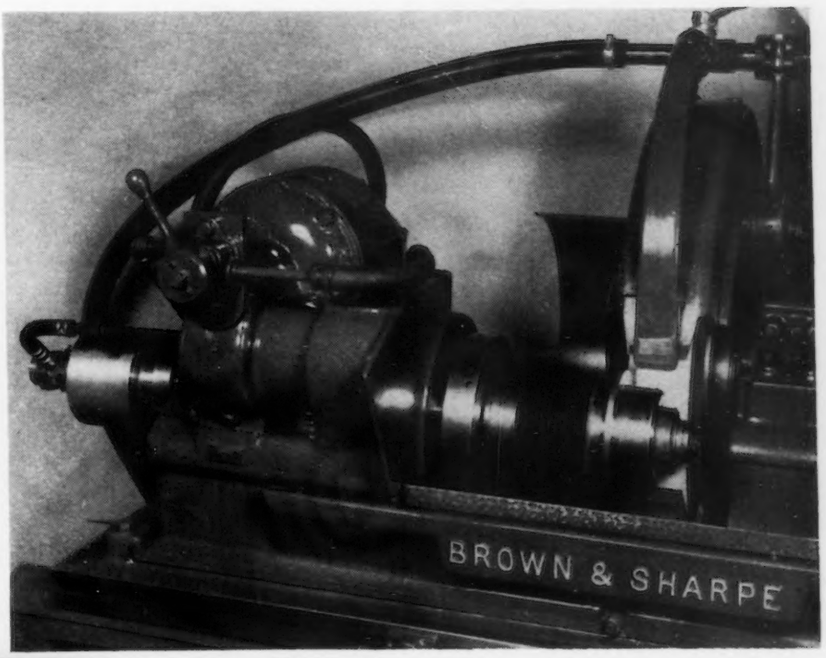
BELOW

THIS Landis 16 x 48 in. plain hydraulic grinder is being used to grind the rifling ring of an artillery shell about 15 in. long and having a body diameter of approximately 6 in. Grinding is performed because of the extreme hardness of the material. A limit of 0.0008 in. is maintained on the rifling ring and 0.040 in. of stock is removed. Production is one piece every 2 min.



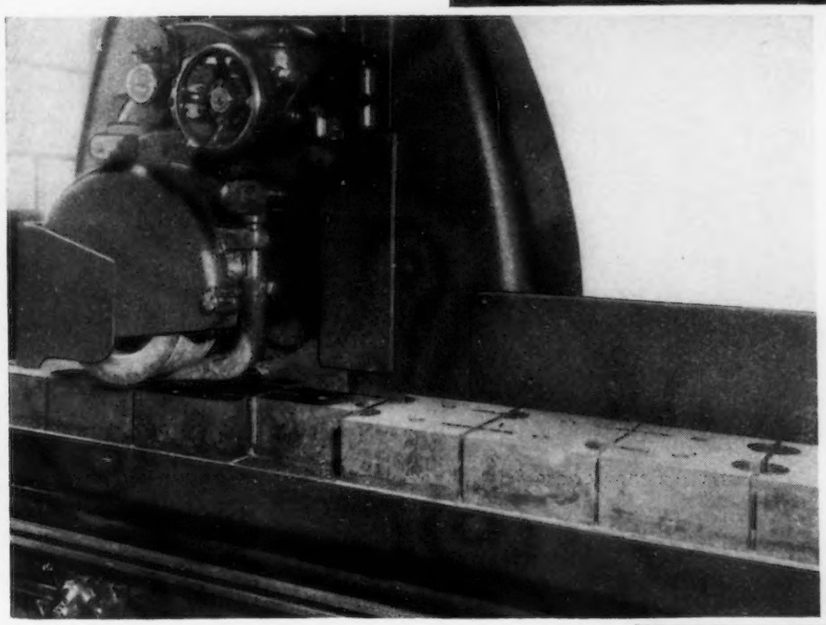
ABOVE

IN this view, the nose of the same shell as at left is being ground in a similar type of machine. Removing 0.040 to 0.120 in. of stock, the wheel finishes off all runout and blends the big end of the nose into the rifling ring. Production time is 3 min. per piece. Floor to floor time, including wheel dressing is 20 per cent greater. The grinding wheel is mounted on the right-hand end of the wheel spindle and the wheel base is set at an angle. A special truing device is used to properly form the wheel for the nose grinding operation and special fixtures support the work.



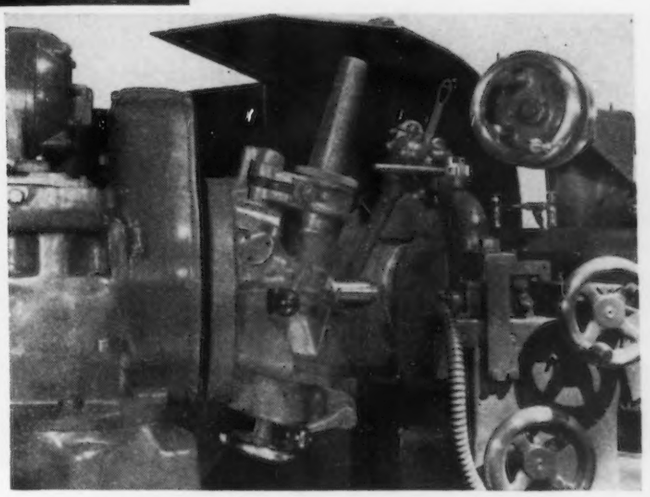
RIGHT

BROWN & SHARPE No. 20 plain grinding machine equipped with revolving spindle headstock fitted with air operated expanding arbor for grinding outside diameter and shoulder of airplane engine cylinder.



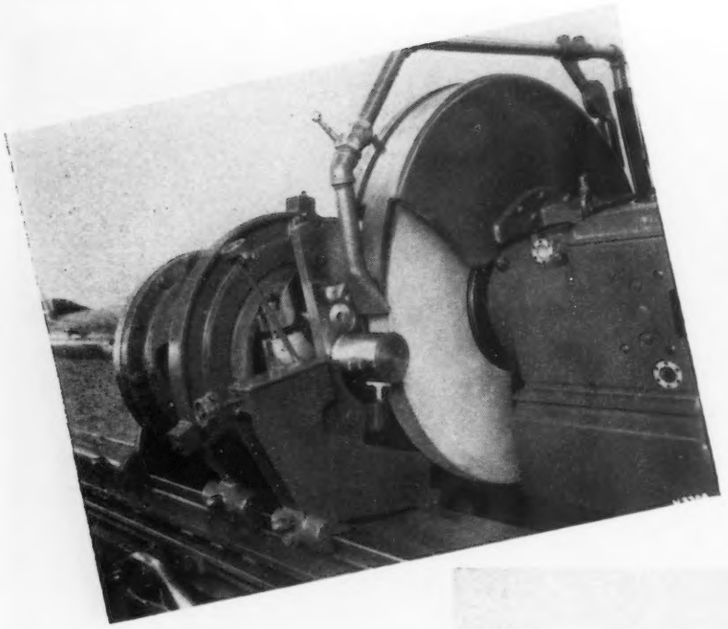
LEFT

MATTISON high powered precision surface grinder shown at work in one of the arsenals grinding breech blocks for 3-in. anti-aircraft guns. All four sides are ground, and although the tolerance is 0.002 to 0.003 in., they are said actually to be ground much closer than that. As many as 30 blocks, measuring 6 x 5½ x 11½ in., can be loaded at one time on the two magnetic chucks.



RIGHT

MANY grinding operations performed on propeller shafts present real problems with respect to holding as indicated by the photograph at the right, illustrating the grinding of trunnions of a propeller shaft on a Landis type C hydraulic universal grinder raised to swing 38 in. The shaft is held in a special fixture which solidly supports it during grinding. There is full provision for locating and indexing inasmuch as all three trunnions (only one is seen) on the shaft are ground without removing it from the fixture. The grinding wheel is dish shaped so as to prevent interference.

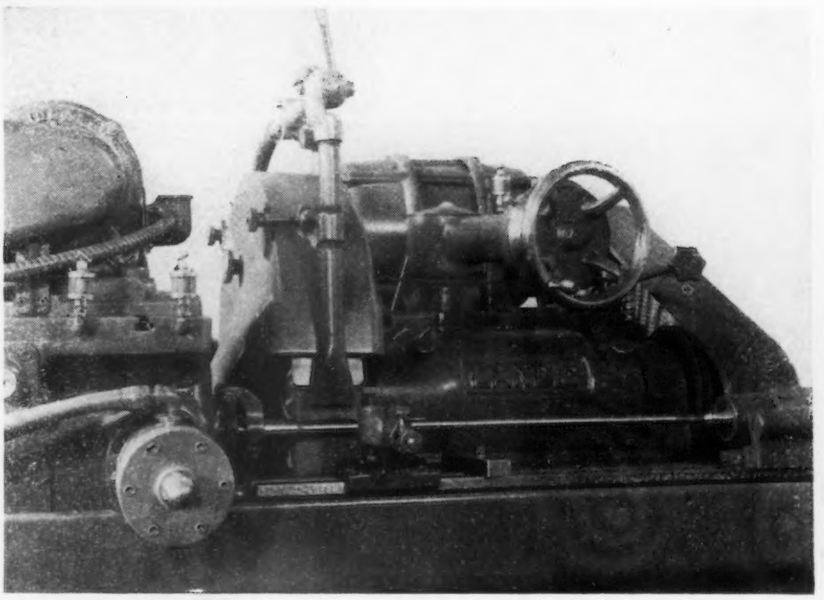


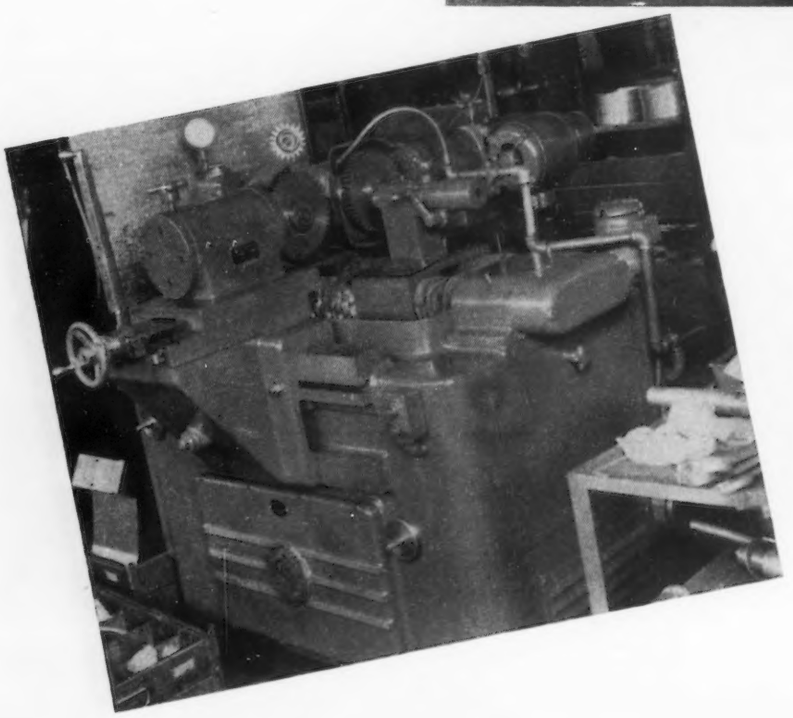
LEFT

STANDARD 16-in. type C Norton cylindrical grinder with the capacity increased to 26 in. and equipped with a special plain bearing, live spindle headstock and workholder for grinding the pins of single-throw radial airplane engine crankshafts prior to the assembling of the two portions. The shaft is clamped in the special workholder, which is further supported by the large outboard bearing shown and rotates about the pin axis. This machine mounts 42-in. diameter grinding wheels and is being used in practically all plants making motors or crankshafts for this type of engine. Similar equipment is also employed for double-throw shafts.

RIGHT

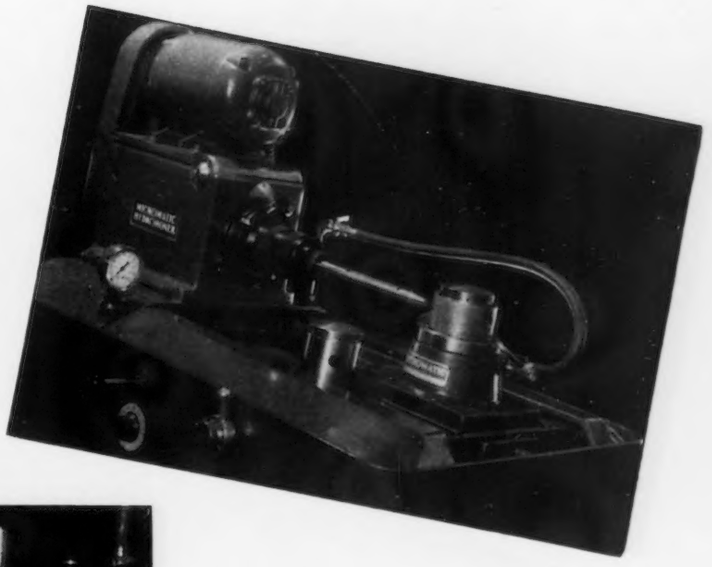
THE design of some machine gun barrels includes a section with an interrupted cut and a slight projection which cannot be touched by the grinding wheel when grinding the o.d. of the barrel. The photograph at the right shows a 10 x 36-in. type C Landis plain hydraulic grinder used for such an operation. The machine is equipped with an integral cam grinding attachment, the rocking motion of which causes the wheel to miss the projections as the work revolves. Because of its length and slenderness, the barrel is supported next to the wheel by means of a work rest.





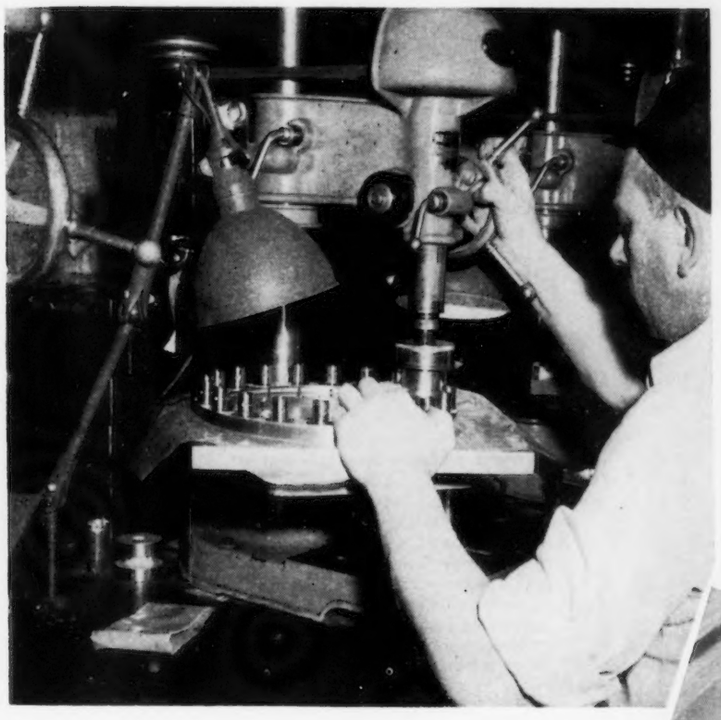
LEFT

HIGH production lapping of medium and small size aircraft engine gears is being performed on a new type highly flexible, two-lap machine, shown at work in a well-known aircraft engine plant. Operating on the crossed-axis principle, this Michigan Tool Co. lapper is automatic in operation. Operating features include a relatively low surface speed of rotation (52 to 283 r.p.m. spindle speeds by change gears) and high speed reciprocation of the laps across the faces, from 90 to 300 per min. At the end of the lapping cycle, one head and one lap retract, permitting ready unloading. The arrangement is such that when the retracted head returns, its lap will be in mesh with the work gear.



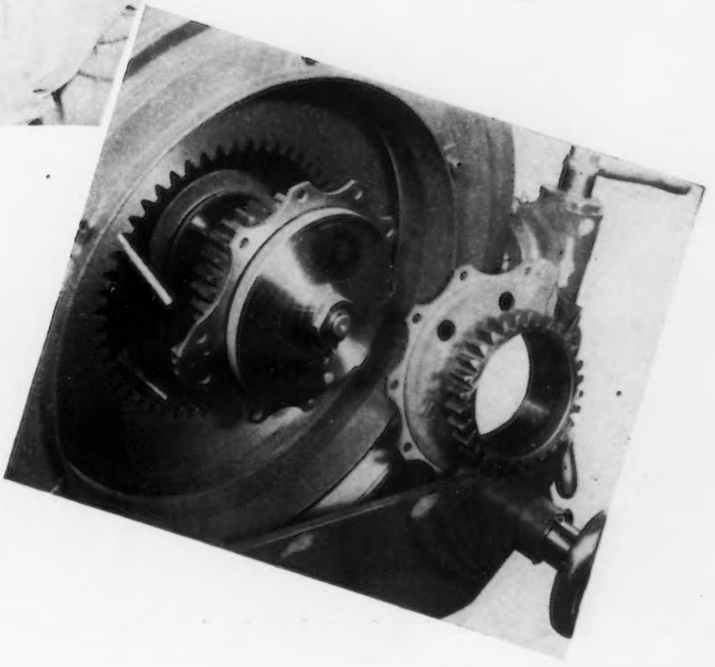
RIGHT

ARRANGED with visual dials to facilitate set-up, adjustment and complete operating control is the new automatic Microsize unit, developed by Micromatic Hone Corp., Detroit. The machine is said to generate accurate sizing—in high production—uniformly within limits from 0.0002 to 0.0005 in. and with a surface finish of 3 to 5 micro-in., r.m.s. Additional controls provide for instantaneous abrasive expansion first to average rough bore size by hydraulic control and thereafter positively restrained against any backlash; followed by a controlled, uniform rate of abrasive expansion to uniform size and finish under variable pressure, with hydraulically actuated control synchronized with an adjustable time cycle. Collapse of the abrasive members is always to the same starting diameter and there is automatic compensation for average stone wear.



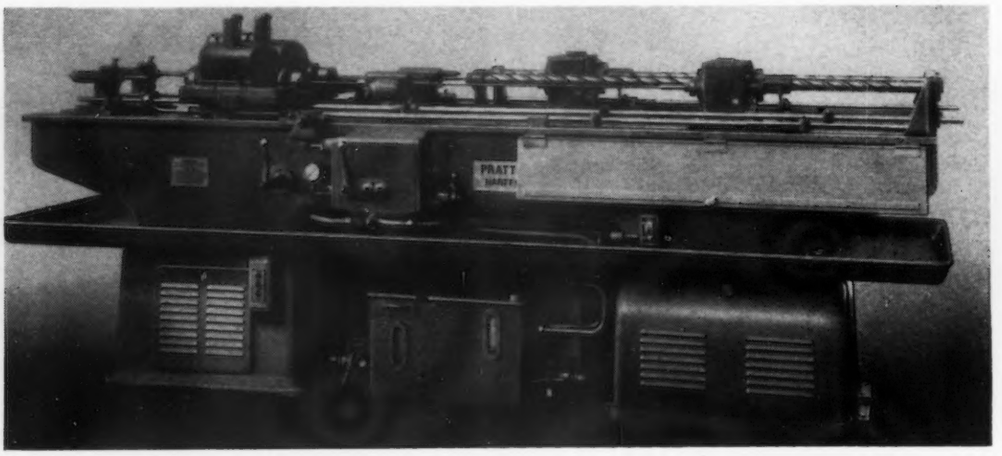
LEFT

LAPPING outside diameter and polishing faces of trunnions for an aircraft engine planetary gear set to a finish of 1½ to 2 micro-in., using a D950 Walker-Turner drill press running at 1200 r.p.m. The chuck used was made especially for this job and is designed to hold small pieces of emery cloth to produce the desired finish. The drill press spindle and chuck are reciprocated up and down the part being worked. Trunnion ring assembly is laid on drill press table with a sheet of waxed paper between it and the table to prevent scratching of the work.



RIGHT

DESIGN is such that this shoulder gear for an aircraft engine cannot be ground after hardening to correct errors from distortion. It is shown being lapped in a Fellows machine. It takes about 30 min. to finish this gear, in some cases removing as much as 0.005 in. error. Precision lapping of aircraft gears is attained by having under control the amount of slippage between the lapping gear and the work. In the lapping of external spur gears, on this Fellows machine, an internal spur gear lap is employed. The tooth shape on lap and work is practically the same contour and therefore presents considerable surface area for lapping. In lapping an internal gear, an external spur gear would be used as the lap.

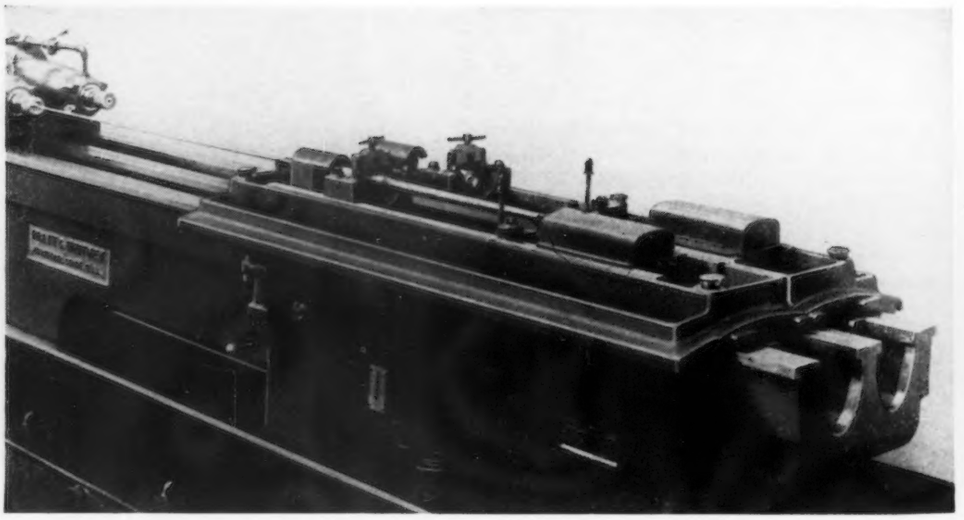


ABOVE

PRATT & WHITNEY'S gun barrel rifling machines incorporate two complete rifling units, hydraulic control and complete automatic cycle. The work is held in a collet chuck which automatically indexes the barrel after each rifling cut. Toward the right of the machine are the rifling tool slides which drive the rifling tools and control their pitch by means of a leader and nut. The leaders are fixed and as the heads move longitudinally, the nuts are revolved and transmit the correct helical motion to the hook rifling cutters. At the start of the operation, the rifling tool extends through the barrel to the tool feeding device at the extreme left and the pull type hook cutter is drawn through the barrel. Upon its return, the barrel is automatically indexed for the next groove and after each complete revolution of the barrel, the rifling tool is fed deeper until the predetermined depth is reached. Coolant is fed the cutter through a hole which runs the length of the rifling tool. At the tool slide end of each barrel is a small motor driven brush which cleans the tool of chips. These machines are made in a range of rifling diameters from 5/8 to 1 1/8 in. and in rifling lengths from 30 to 98 in.

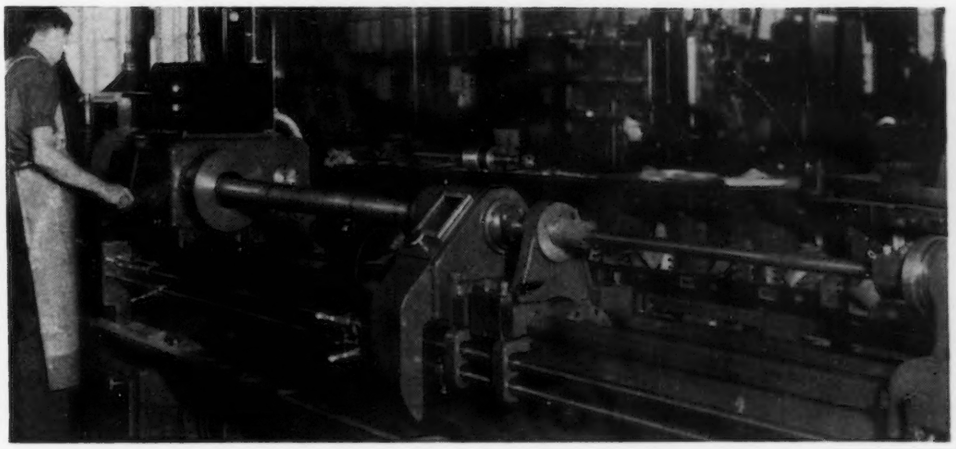
BELOW

IN the Pratt & Whitney deep hole reamer, which was primarily designed for reaming rifle barrels, the work is held in a fixture on the work carriage. Best results are obtained usually by feeding away from a pull type floating reamer. The smooth pull of hydraulic feed and the even power from the V-belt driven ball bearing spindle are said to result in holes that meet the most exacting requirements of size and finish. The two reaming units shown are entirely separate, each having its individual spindle motor, hydraulic feed motor and coolant pump. This arrangement enables the operator to be reloading or checking work at one spindle while the other is in production. These machines are made in sizes with reaming capacity from 30 to 74 in. and reamers from 3/16 to 1 in.

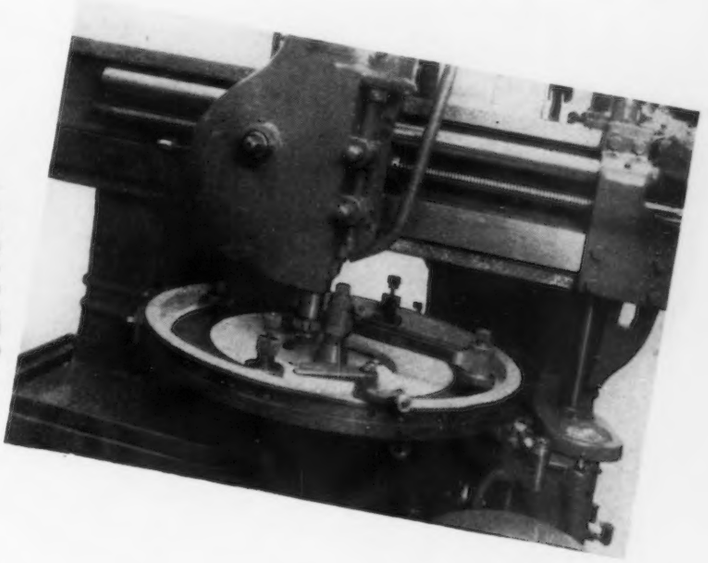


ABOVE

BROWN & SHARPE No. 2 vertical milling machine (light type) equipped with special cam operated spindle and special rotary fixture for finishing valve stem boss on inside of airplane cylinder head.



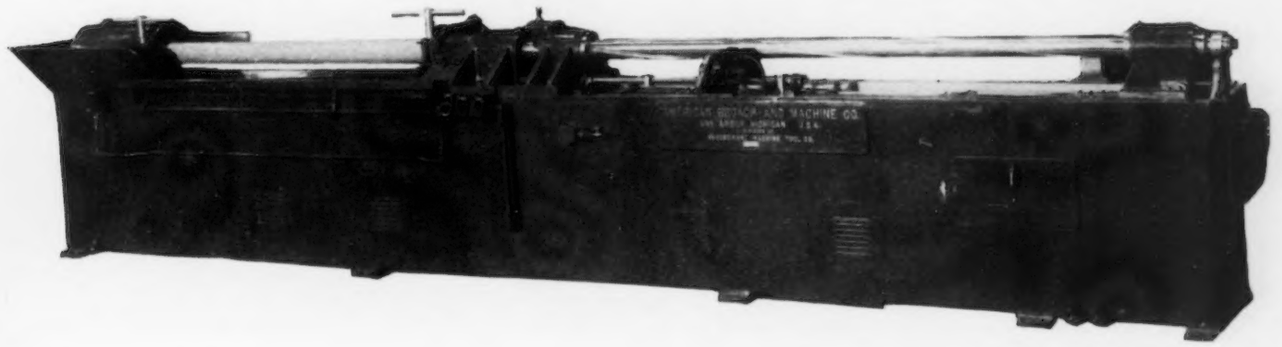
INDEXING the gun or indexing the bar is possible with the LeBlond No. 2 rifling machine built for rifling guns up to 3 in. bore and 88 in. length. The grooves may be either cut or broached. Carriage travel is by hydraulic power supplied from a 5-hp. motor driven vane pump, with forward and reverse speed determined by two adjustable speed control valves. The control rod runs the full length of the bed and operates a four way valve to start, stop and reverse the direction of travel of the carriage. Adjustable stops control the length of stroke which is a maximum of 10 ft.

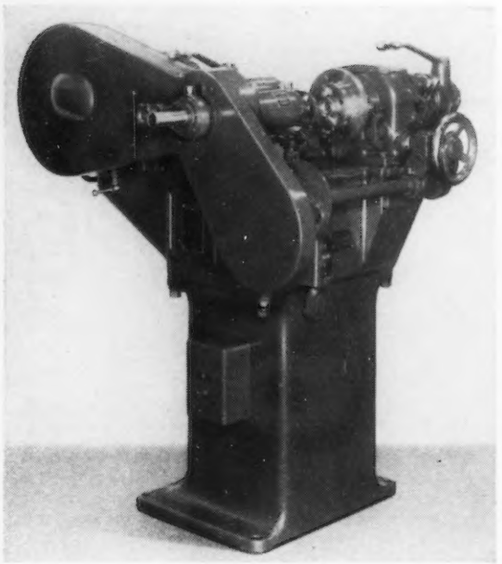


RIGHT

CIRCULAR ends of airplane engine connecting rods are being machined in this special Fellows gear shaper. As only a partial revolution of the work spindle can be made in machining the end of the rod, a special mechanism is provided to stop the rotation of the cutter and work at the desired point. Fixture carries an adjustable stop which automatically trips the rotary feed. Both semi-circular ends of the rods are finished by the same cutter simply by reversing the rod on the fixture. Cost of doing the work in this manner as compared with milling is said to be in the ratio of about 3½:15, and a much better finish is said to be secured, simplifying the subsequent polishing operation.

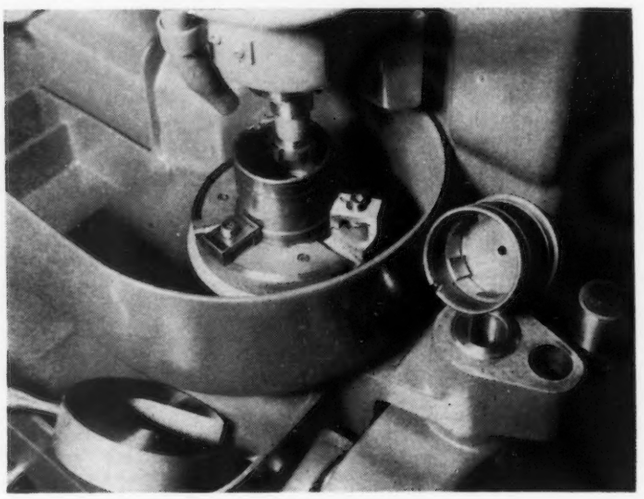
ALL of the 36 spiral grooves, 0.030 in. deep, are broached simultaneously in this large American Broach hydraulic gun rifling machine for 105 mm. howitzers. A series of 24 cutters are pushed through the rifle barrel in sequence, each cutter removing a little more metal from each groove than the preceding cutter did. Approximate time for complete broaching of a barrel is 1½ hr. This view shows the complete machine with the guard removed from the master spiral bar end. The master lead bar is hollow for coolant supply and is driven laterally through a roller thrust bearing on the cylinder slide unit. Coolant supply is directed to the cutter edge by means of a telescoping feed tube arrangement which eliminates the use of flexible tubes. At the end of a stroke, machine automatically stops and coolant shuts off. Operator lifts guard, removes cutter and returns machine back to original starting position. He then takes the next larger size cutter and repeats the operation. Cutting speed is 15 ft. per min., stroke, 100 in.





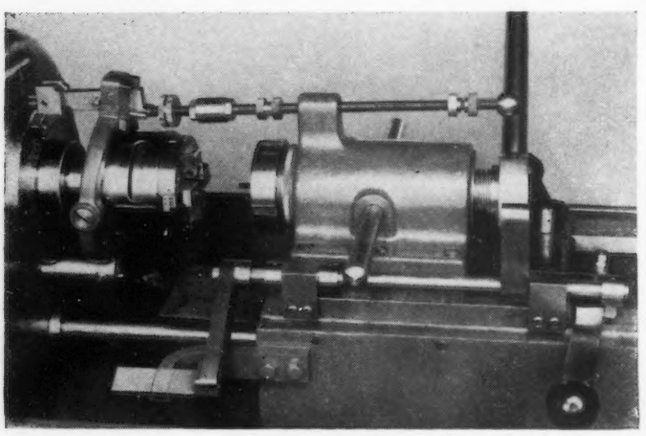
LEFT

WHILE designed primarily for milling or routing the groove in shell rings this horizontal milling or routing machine developed by the Reed-Prentice Corp., Worcester, Mass., is adapted for other classes of horizontal milling of the interrupted groove type. Spindle has a collet chuck for holding the cutter and is driven at speeds from 6000 to 7500 r.p.m. by V-belt from a 2-hp. motor. Shell rings are held in a lever operated chuck and are positioned by means of a pin. Automatic rotary feed is provided to the power driven rotary workhead. The sliding head of the spindle is operated by a lever and is brought to proper depth of cut by micrometer adjustment and is held in position by a latch. This latch is disengaged and the spindle automatically withdrawn from the cut by a stop on the rotating work fixture. The cutter spindle is guarded while the operator loads and unloads. Production is as high as 160 pieces per hr.



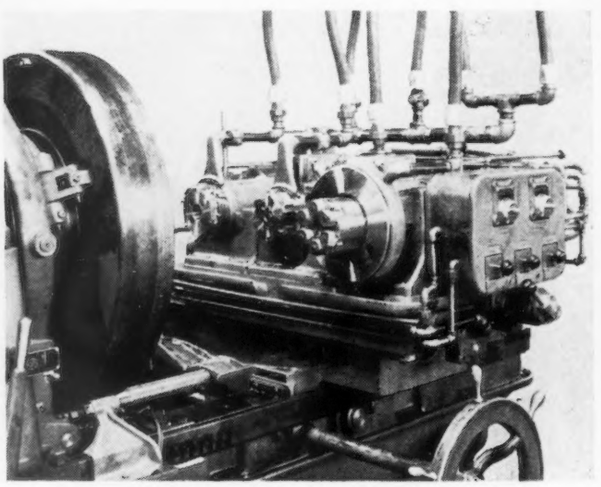
BELOW

INASMUCH as a great many studs used in aircraft engines require that the first two or three threads be undersize by a definite amount, Eastern Machine Screw Corp. has equipped its No. 10 Aero threader with a double trip rotary insert chaser diehead where both the undersize and full size pitch diameters can be adjusted independently. The photograph shows a closeup of the diehead and double tripping mechanism.



ABOVE

CUTTING a series of large internal splines in an airplane engine starter part called for some modification of this special 7A type Fellows gear shaper since the splines are considerably below the top of the rim—in fact, much more than the total stroke of the machine ram. Hence a special work elevating and lowering mechanism must be used, operated by an air cylinder and controlled by a foot treadle. A slotted washer, shown at the left, is inserted beneath the work holding fixture in the upper position to take the thrust of the special spline cutter on the work.

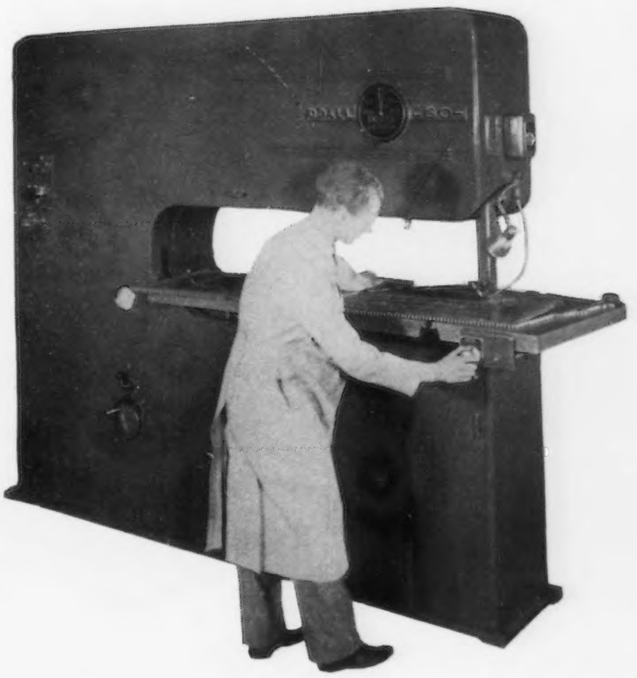


RIGHT

BOTH tapping and chamfering of shell of various sizes can be performed with the Murchey No. 22 shell tapper. Special shellholding fixtures have been designed to effect concentricity within a few thousandths. After approximate location, the shell is picked up by a female center actuated by an air cylinder, forcing the shell forward until the nose is firmly held in a serrated bushing. Collapsible taps are provided, with four reaming tools and four chasers. These are operated by yokes operating between adjusting stops which will trip the taps to predetermined thread lengths and reset them for the next operation. The shells are then chamfered with the tap chasers collapsed. A double spindle machine is shown.

RIGHT

UNUSUALLY large contour sawing jobs on templates and other irregular shapes such as are encountered in shipyards and aircraft factories can be handled in the new super V-60 Doall, made by Continental Machines, Inc. Its 5-ft. throat depth means that it can actually cut to the center of work 10 ft. in diameter. Work up to 12 in. thickness can be cut, and this work can be done with considerable speed and precision since the machine uses narrow band saw blades varying from 1/16 to 1 in. in width. A butt welder is included for joining any of these saws. For wide work, the saw band passes over three wheels and two 50 in. square work tables are used in tandem. For smaller work only the two main drive wheels are used. Automatic hydraulic power feed is available as well as hand screw feed. Saw speeds can be varied from 50 to 1500 ft. per min.

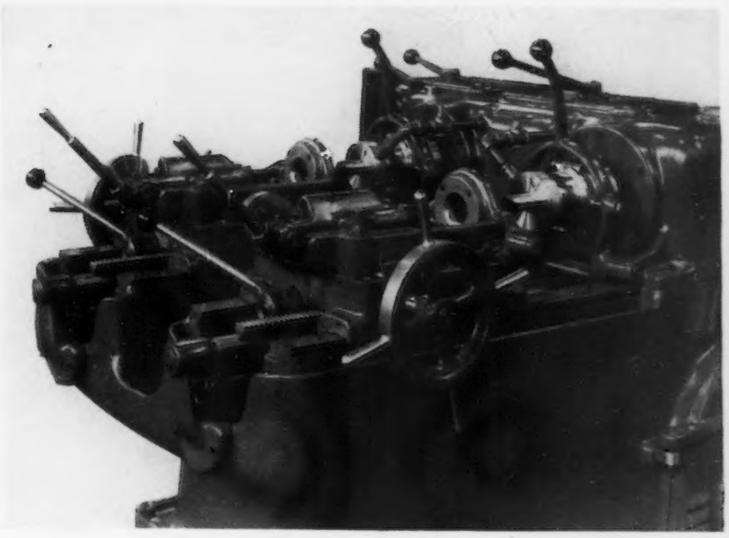


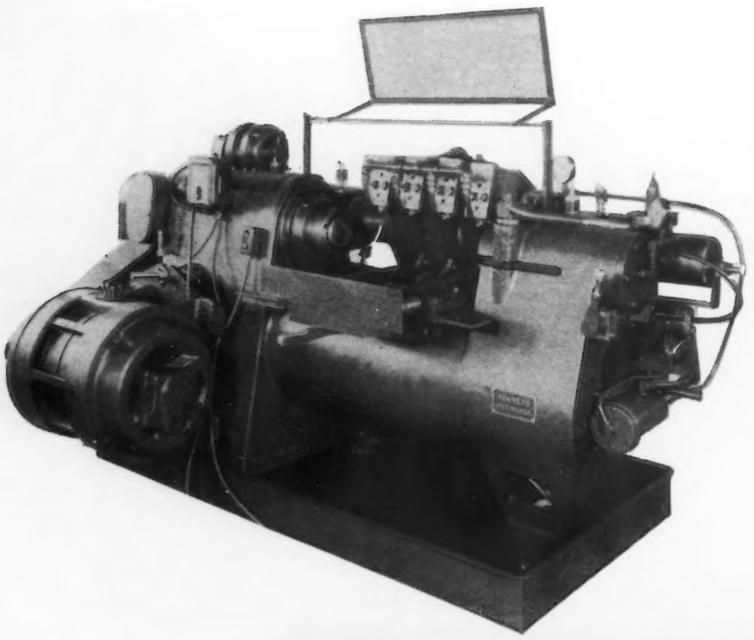
ABOVE

ESPECIALLY adapted for close work in the aircraft industry and consistently giving class 3 and class 4 fits, is an improved type of tapping machine made by the Bakewell Mfg. Co., Los Angeles. Principal design feature is the use of two brass fingers, in place of a nut, running on the lead screw, one on each side, to guide the tap into the hole. The unit also incorporates a clutch that is adjustable to the torque of the tap and that practically eliminates tap breakage. On the No. 1 automatic machine, 20 complete cycles can be performed per min. Depth of tapping and reversal of the spindle is effected by means of limit switches and a two speed reversing motor, giving 900 r.p.m. forward and 1800 r.p.m. reverse. Depth of tapping can be held within 0.008 in., it is said.

BELOW

FOR tapping the nose of 60 and 81 mm. high explosive mortar shells, the Landis Machine Co. has recently added the Landmaco HO shell tapper to its line. A double head type, for each spindle, this machine has a special work holding device mounted on the carriage comprising a bushing to support the nose end of the shell and either a male or female rear centering bushing as required. Locking of the work in the fixture is effected by advancing the centering bushing by means of a lever operated cam. The tap is a collapsible type and is designed primarily for cutting straight threads. Means are provided in the special trip ring to direct an ample flow of coolant within the bore of the work.



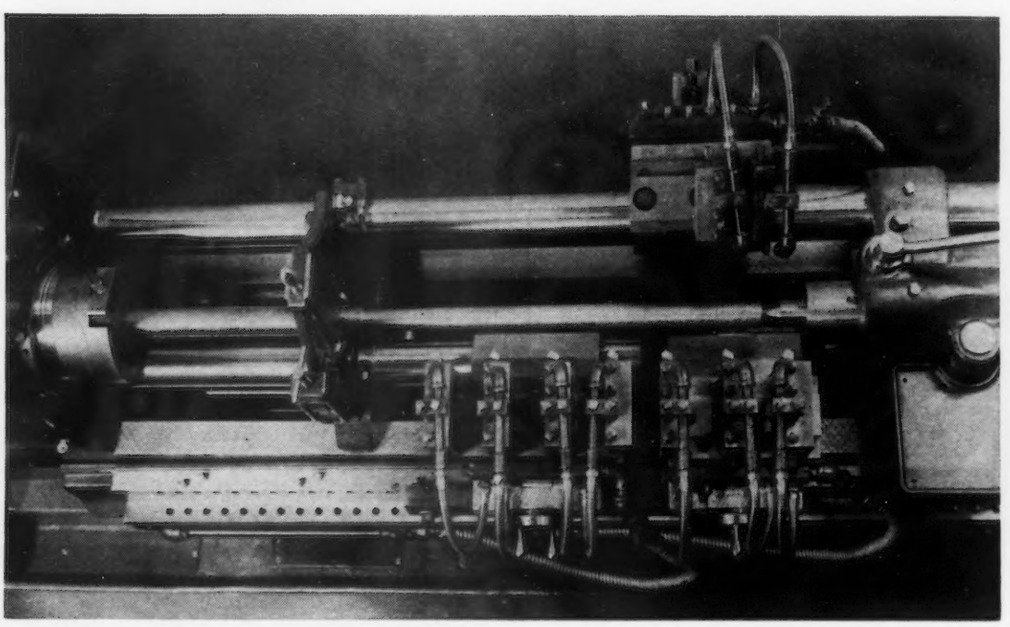


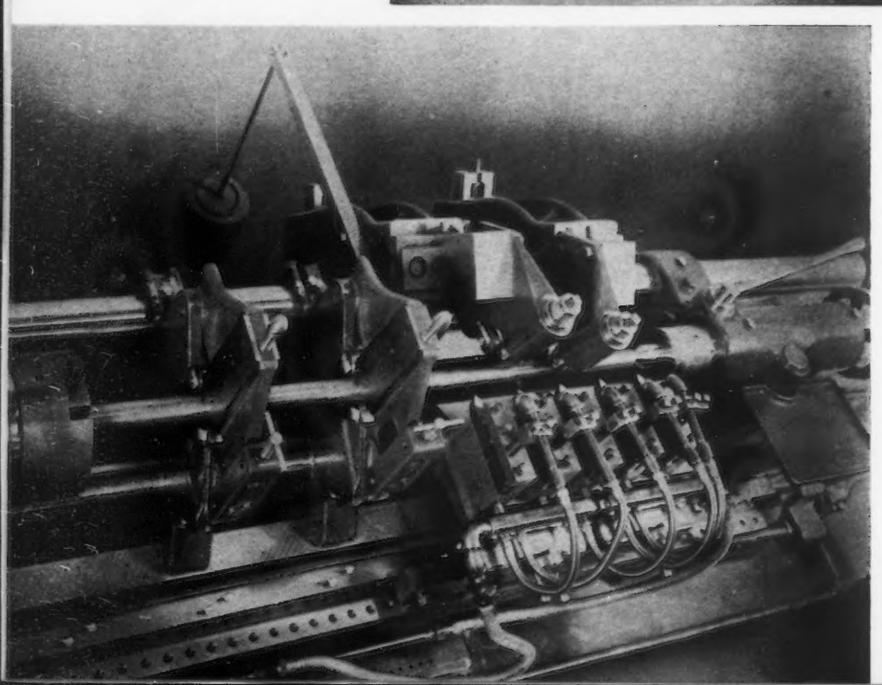
LEFT

STAMETS single operation machine for straight or form turning of shell up to 6 in. diameter. It has a cylindrical bed with integral headstock and separate tailstock. The tailstock spindle is in effect the piston of an air cylinder and carries a center mounted in Timken bearings. Drive spindle is also mounted in Timken bearings and contains an air operated expanding collet for driving the work. At the rear of the bed are two shafts, the upper one carrying the several tool rocker arms and the lower shaft carrying the templates of the required contour. Upper shaft is fed longitudinally by a screw. At the end of the feed stroke the tools are automatically retracted and returned to the starting position.

RIGHT

IN the first rough turning operation on rifle barrels in a 12-in. Fay automatic lathe, the barrel is mounted between centers and is supported by a three - roll steadyrest contacting a previously turned surface. Drive is by a dog engaging a floating drive plate at one end. One carriage carrying four tools turns the long taper diameters, and another front carriage has three tools for turning the straight diameter at the breech end. The back arm carries one tool to form the taper between the two straight diameters and a chamfering tool for the barrel end. Feed is by taper cam bars. Using high speed steel tools, approximate production is seven barrels per hr.



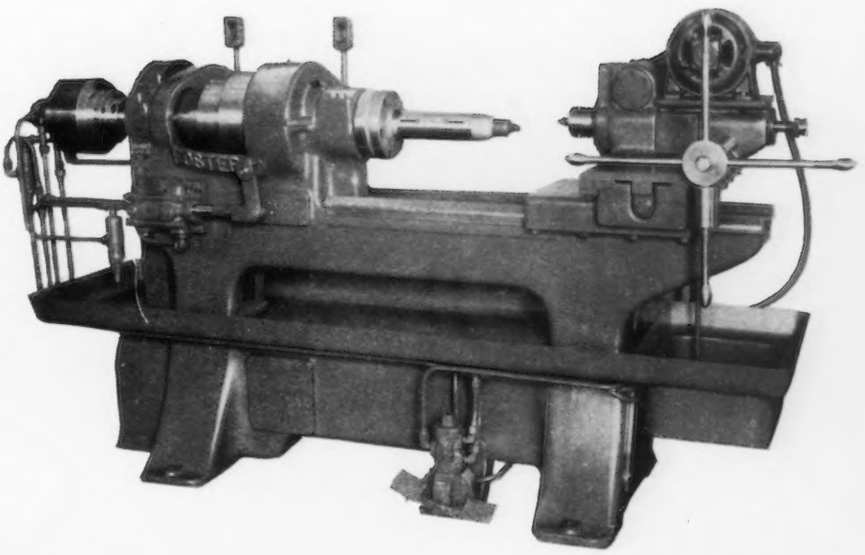


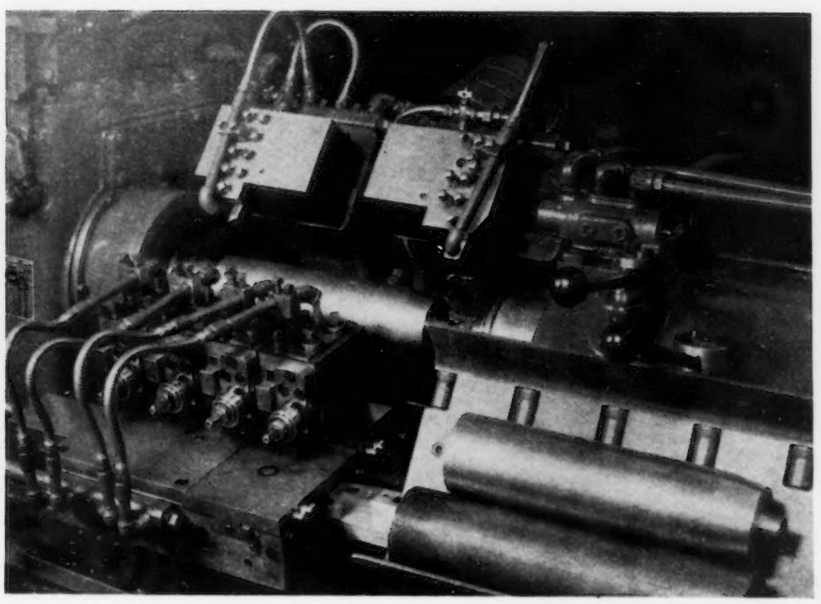
LEFT

FOR the second rough turning operation on rifle barrels in a Jones & Lamson 12-in. Fay automatic lathe, the work is held in centers as before and is supported by two three-roll steadyrests contacting the turned part of the barrel and by a two-roll vibration damper and a two-roll steadyrest mounted on the back arms. Three turning tools on one front carriage and two on another all turn tapers on the muzzle end. The vibration damper with spring loaded rolls contacts the rough stock just before the carriage tools start cutting. Then as soon as the carriage tools have rocked into depth and travelled a short way, the steadyrest rolls contact the turned diameter and the vibration damper rolls are automatically relieved. A similar arrangement, but with more tools, is used for the finish turning operation.

RIGHT

FULL hydraulic control through a foot operated floor valve is featured in the Foster shell centering machine. After centering is completed, movement of this pedal brakes the spindle, moves the centering head and its 1-hp. driving motor out of the way and releases the work on the expanding chuck. After the next shell is loaded, movement of the pedal in the opposite direction chucks the work, releases the brake and puts the spindle in motion, and moves the center head unit forward into the working position. Actual feeding is done by hand through the medium of the turnstile. Machine has a capacity for shells from 37 mm. to 155 mm., production averaging 875 and 275 shells per 8 hr. at 85 per cent efficiency.



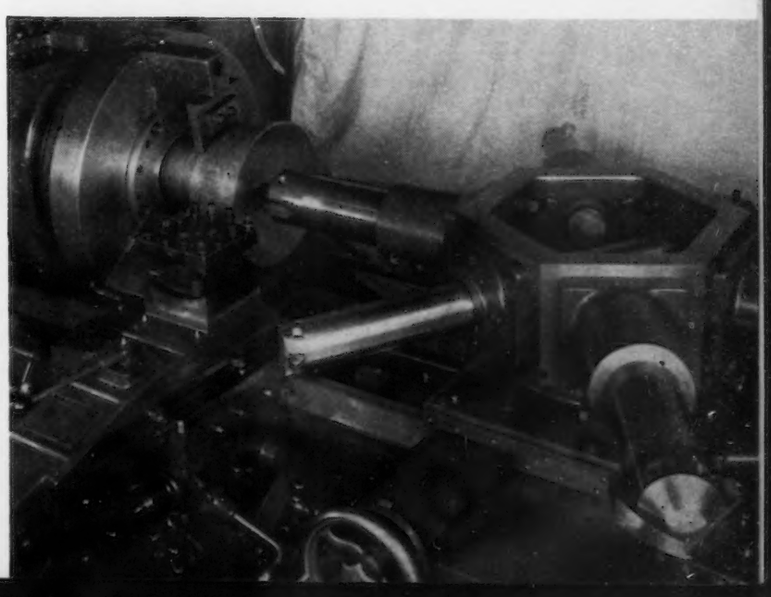


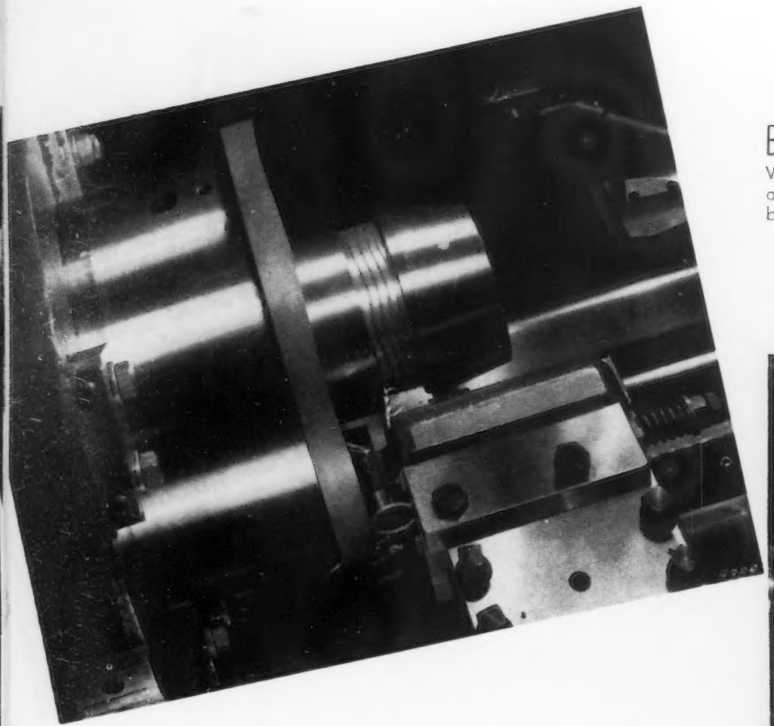
LEFT

MUCH greater strength and rigidity have been built into the 16 x 33 in. Fay automatic lathe for rough turning a 5 in. shell than for the standard Fay of similar capacity. The carriage turns the outside diameter, using four carbide tipped tools turning toward the tailstock, while the backarms face and form. Average cutting time is 1 min., 20 sec. Shell is located from the bottom of the forged cavity and is driven by a hydraulically expanded, three jaw fixture. Closed end is supported on a revolving tailstock center, which can be withdrawn hydraulically and rocked up out of the way for unloading and loading. This action brings the loading tray shown into a horizontal position and at a height so that the shell can be slid directly off the holding fixture.

RIGHT

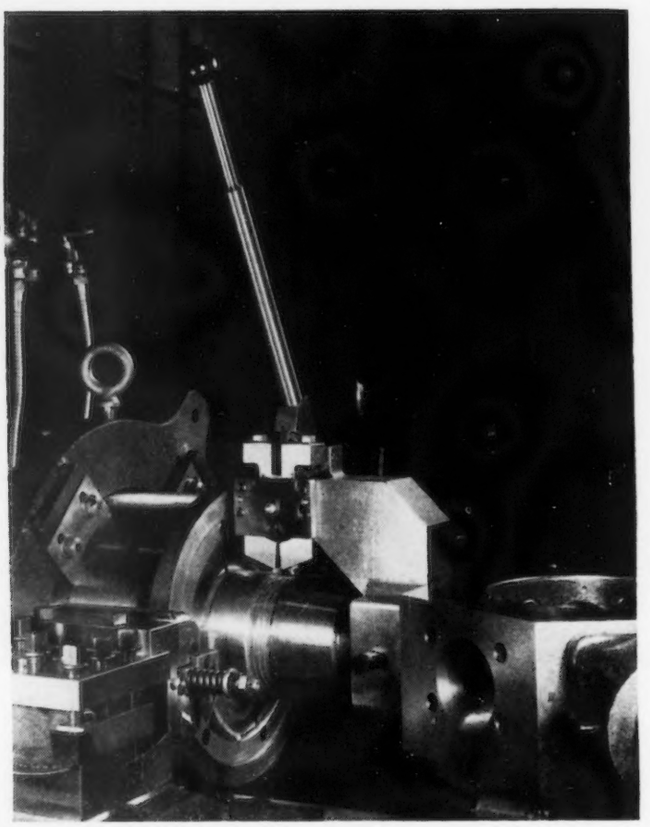
THIS 14-in. projectile nose is being turned on a Warner & Swasey No. 4-A turret lathe with cross sliding hexagon turret. The rough forming and semi-finish forming of the contour are being done by spade type flat cutters. The finish operation is done by a single point cutter held in a boring bar. Contour is generated by use of a contour plate on the taper attachment.





LEFT

BAND groove formed on a 6-in. Howitzer shell by means of a cutter in a dovetail holder in the square turret post of a Warner & Swasey No. 2-A heavy duty turret lathe. Actuated by a cam plate on the face of the chuck, the cutter forms three bands having six rises on the circumference with a pitch of 1/8 in. This band groove keeps the copper band from slipping.



BELOW

THE largest Cleveland single spindle automatic ever built—a model A machine of 9 in. capacity—is installed at the plant of the Hamilton Standard Propeller Division of United Aircraft Corp. A typical job performed on this machine is the simultaneous turning of four gasket nuts for propeller hubs from SAE steel tubing of 9 in. o.d. and 8 in. i.d. First operation is to feed to length; second, turn o.d. and bore i.d.; third, face end of bar and form o.d.; fourth, open space, and fifth, cut off four rings. Using high speed steel tools and a cutting speed of 86 ft. per min., production is 11½ rings per hr. gross.

ABOVE

CLOSE-UP of a special tool holding two cutters which create a 20-deg. undercut on the sides of the band groove of a 6-in. Howitzer shell. The tool is mounted on one of the turret faces of a Warner & Swasey No. 2-A turret lathe, and is operated by the hand lever shown. Other tools on this set-up are: flat start drill, flat cutter, form cutter and single cutter for recess.

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For lack of space in this issue, this series illustrating defense production operations will be continued in next week's issue.

Tool Engineering Applied to Tool Design

By FRANK W. CURTIS
Chief Engineer, Milling Machine Division
Van Norman Machine Tool Co.

TOOL design has become one of the most important branches of shop operation, because only through the use of adequate jigs and fixtures is quantity production made possible. Tooling forms the basis of interchangeable manufacture which in turn has made low-cost output a reality. The utmost in efficiency that may be gained by the use of tools, however, is dependent largely upon the ingenuity of the tool designer. Hence, the best of talent in tooling is economical.

Tool designing embodies a great deal of responsibility because the success or failure of a jig or fixture will depend entirely upon the principles used in its origination. Experience, of course, is the best teacher, but here again the use of sound principles developed over a period of years, which in turn, have become recognized as good practice, is the fundamental basis for a good tool.

Starting with a given part to manufacture, an operation sheet listing the sequence of operations in proper order, the design of tools then centers itself around (1) the selection of locating points and surfaces; (2) precision in locating and holding the work firmly so as to preclude slipping and preferably so that it cannot be inserted incorrectly; (3) the use of quick-operating, positive clamps, arranged so as to avoid distortion or springing; (4) provision for chip clearance, with special emphasis to the ease of cleaning, and (5) copious access for cutting fluids and compounds to reach the point of cutting when coolants are required.

In reality, every jig and fixture is an invention, using a variety of basic principles grouped together to perform a given task. The more principles available to draw from, the more practical is the fixture likely to be. A clamp, for example, might embody several principles such as its physical size, the method for moving it back and forth over the work, or revolving it as the case might be, the type of hinge used, the screw adjustment and the type of knob or handle for operation.

Practice usually will dictate the best designs for overall use, but as a rule, tools for a certain type of product will require a certain type of principles that usually can be applied successfully within a given plant, and standardization will then become possible. In this direction, much can be done to lower the cost of tool manufacture, as well as to simplify design. By standardizing such units as bushings, spring plungers, clamps of various types, locating buttons, handles, knobs, etc., these parts can be made in quantities and drawn upon as needed.

Standardized Units Desirable

While many plants have adapted standardized fixture units, it is still obvious that many shops design tools on a "hit or miss" basis with handles, clamps, knobs and other units differing from each other in some minor way which, of course, results in added expense without any economic benefit.

Having a variety of unit designs to choose from, unquestionably serves as a valuable reference in tool design. Good and bad features alike should be included because it is just as important to avoid ideas that may cause trouble as those that are foolproof. In V-block design, reviewed in Fig. 1, nine times out of ten the angular surfaces are ground flat, and a recess at the bottom of the V is provided to facilitate grinding.

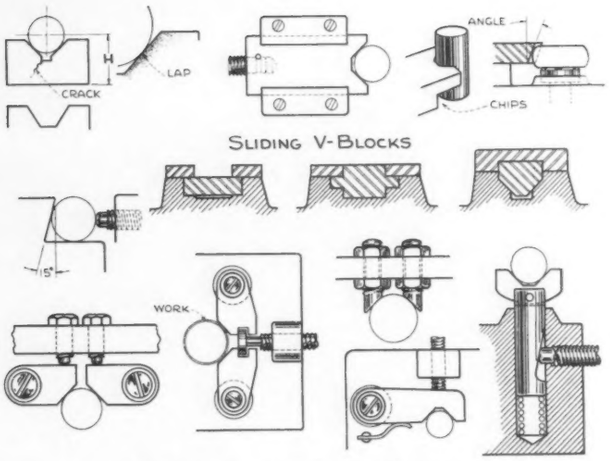

FIG. 1—Design variations in V-blocks for holding round work.

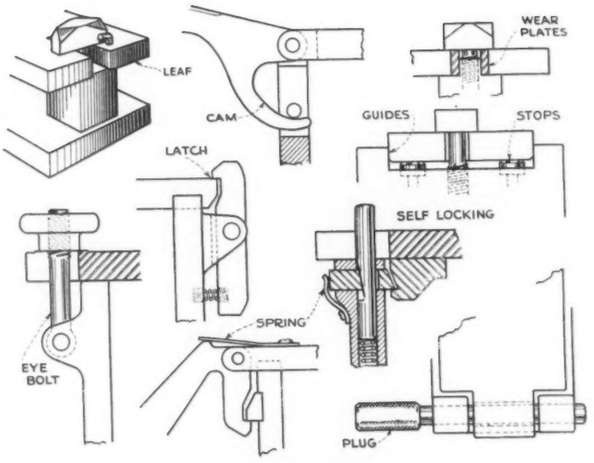

FIG. 2—A number of possible designs of jig leaf clamps are suggested.

While this design fulfills many needs, it is not the most practical. If care in hardening is overlooked, the block is likely to crack at the bottom of the recess.

Then, if accuracy in height to the centerline of a round piece is important, the flat ground surface will not hold up as well as a slightly lapped surface. In other words, the flat ground surface soon wears as a result of friction, and grooves will appear in height location. By making the V-block with lapped surfaces to start with, the accuracy can be maintained for a far greater period. The lapping procedure is carried out by allowing about 0.002 in. on the height, which in turn is lapped by a bar or rod the same diameter as the workpiece.

V-blocks with an angle on one side have a wide variety of uses and are economical to make. Sliding V-blocks, likewise, find a wide use and are essential in many ways, but care should be taken to avoid failure due to abrasion from chips and dirt. The slides can be made in many different ways, depending on the appropriation available, but regardless of type, the slide should be solid enough to preclude a raising action when it contacts the work. Provision to take up wear, too, is an essential consideration. Angular surfaces on the face of V-blocks have a decided advantage where they can be used since they hold the work firmly downward.

Deviating from traditional V-block design often results in novel ideas that are economical and practical. The V-block can be made in two parts with provision for independent adjustment, or in the form of two separate studs with angular faces. The two piece V-block can be made to operate by a single screw, or the V-block can be made as a single hinged piece with screw adjustment. All these designs offer easy cleaning and adequate adjustment.

Jig Leaf Clamps

Clamps for jig leafs may be selected from a variety of designs, such as are illustrated in Fig. 2. The thumb screw type is perhaps the most common because it is comparatively inexpensive and effective. The cam type is good where a positive pull down action is required. Quite broadly used is the hinged eye bolt jig clamp which offers a position action. Where extreme speed is desired, the automatic latch type finds a wide use, since it is only necessary to drop the leaf and the latch engages itself. The self-locking type is rapid also. To raise the leaf, the pin is pushed down at the same time the leaf is raised. The use of a ground plug through holes in the jig body and a bushing in the leaf offers accuracy but is slower than some of the other designs.

Other portions of drill jigs that can be analyzed in this manner are

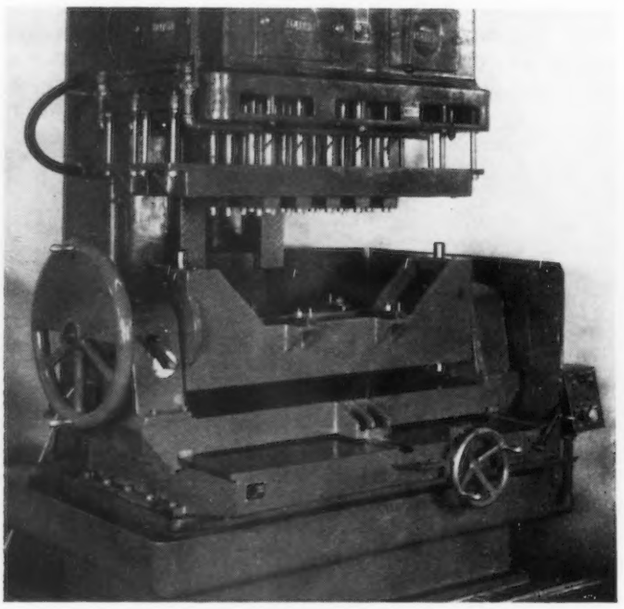

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FIG. 5—Drilling and reaming of holes in a cylinder block from opposite sides are made possible with this cradle indexing type fixture arranged on a slide for ease in loading.

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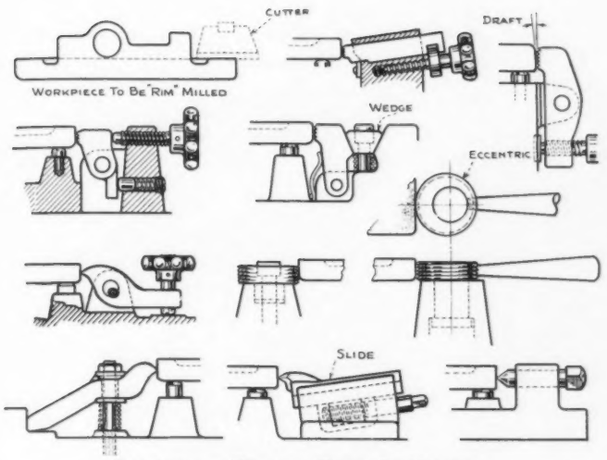
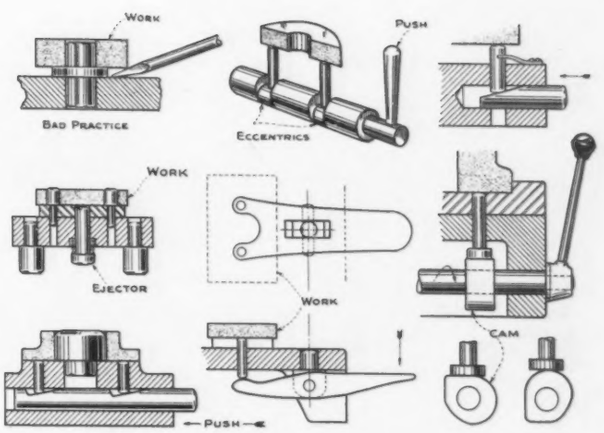


CLAMPING BELOW FACE OF WORK

FIG. 3—Design principles adaptable for clamping work below the face to be worked.



EJECTORS FOR JIGS AND FIXTURES

FIG. 4—Cam or wedge action is most frequently applied to ejector design.

leaf pins, leaf stops or rests for the leaf when thrown back, and jig feet, all of which can be made in various ways to suit a given need. The problem is to select the design most appropriate for a given purpose, and then try to standardize it as broadly as possible.

Clamp Design

Clamps for jigs and fixtures, Fig. 3, offer a wider field for originality and selection than any other form of fixture unit. There are perhaps as many poor clamps as there are good ones and only by carefully analyzing the different types available can the designer make the correct selection. The requirements of a clamp are that it will hold firmly, that it won't clog up with chips and that it won't spring the workpiece out of shape. Sketches of clamps of different types make an excellent reference for the designer. Some form of standardization is, of course, essential and often clamp units completely assembled lend themselves to mounting on fixture bodies so that designing and building alike are simplified.

Very often it is necessary to clamp a piece for milling around the entire edge which naturally calls for a clamp to be arranged below the finished surface. By having a selection of such clamps to draw from, the "guesswork" of tool design is overcome. Usually, the clamp has to have a knife edge or serrated face to "bite" into the work. A hinged clamp with screw adjustment is excellent for this purpose, but the problem of chips must not be overlooked. The same design principle applied to a wedge also works well. Toe clamps are satisfactory where the work does not vary too much in size, but one of the best is the slide type with knife edge operated by a screw. In many cases, the threaded eccentric clamp offers a positive grip since

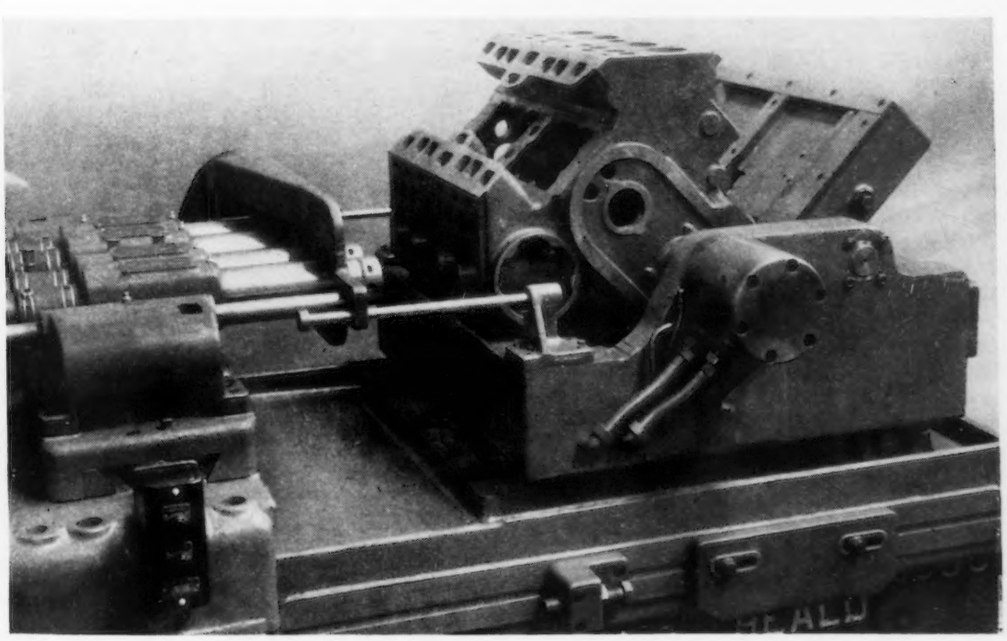


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FIG. 6—This hydraulically actuated fixture is arranged to tilt so that the cylinder block may be slid off of or onto a roller conveyor to the right, not shown in this view.

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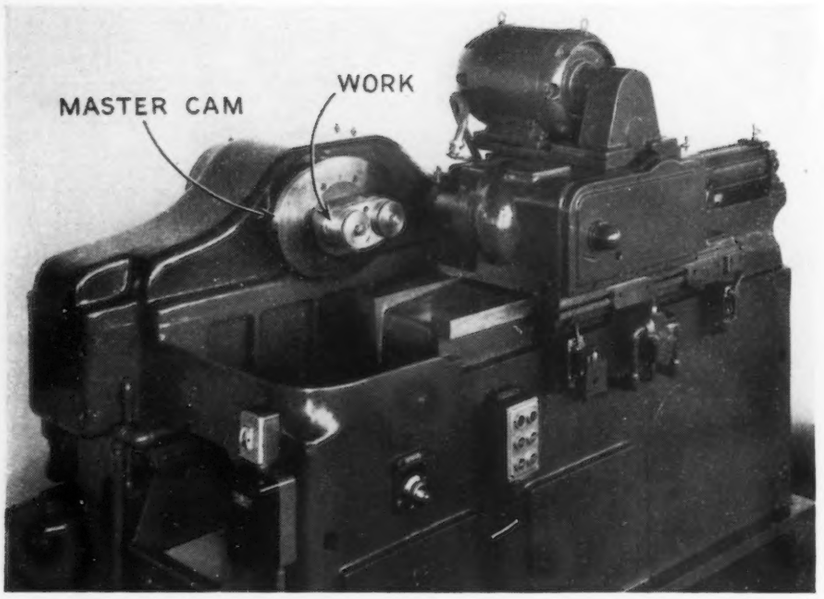

FIG. 7—In this example of contour milling, the work-holding fixture with master cam is actually a part of a special machine base.

the threads bite into the edge of the work and pull down at the same time. Where the draft of the workpiece tapers back the clamping arrangement is simplified over a straight-edged piece. A pointed screw is perhaps the most simplified form but it has limitations.

Ejectors

It is just as important to eject some types of work as it is to locate it, and the designer should not overlook some means of easily removing a part that has to be located on a stud or plug. The use of a screwdriver is bad practice because it results in forcing the locating plug out of alinement. On small jigs a simple pin ejecter, Fig. 4, can be located under the work and by lifting the fixture and hitting the ejector over an anvil of some sort, the work will be removed easily. A shaft with two eccentrics contacting two pins will quickly remove a piece located over a central stud by a single turn of the handle. A hinged ejector is very effective for removing small parts and, of course, lends itself to easy mounting. For larger work a cam-operated ejector will lift heavy work with ease. The push type ejector also is effective and can be made either to operate a single ejector pin or two or more as may be needed. All these designs are comparatively simple in design, can be mounted economically, and serve a very important need.

Other jig and fixture units that lend themselves to study in this manner are spring plungers, locating blocks, and work stops. In all of these, the requirements are much the same, namely, to be trouble free, easy to clean and foolproof. Perhaps the most important requirement of all fixture units is rigidity. Ample strength is very essential because tooling usually gets hard usage and any weakness will result in breakage and delay, in addition to the expense of repair or replacement.

Among the examples of finished tools, illustrated in Fig. 5, is one for drilling and reaming a number of holes from opposite sides in an in-line type cylinder block in a Baush drilling machine. The fixture is of the cradle indexing type, arranged on a slide, to permit positioning the work under the spindles after it has been loaded. The work is held in the fixture from a flanged face by four clamps and is located by two blocks that fit into the end bores. The operation is handled by dropping the work into the fixture, then clamping it, after which the slide is moved inward by a handwheel, the exact drilling location being obtained by an automatic locking pin. The holes are drilled, then the slide is readjusted to the reaming position by withdrawing the plunger and moving the slide inward by means of the handwheel, at which time the locking pin again locates the fixture carriage in the correct position. After reaming has been completed, the slide is withdrawn, a trunnion locking pin is withdrawn, the large handwheel at left is revolved over an arc of 180 deg., to place the bottom of the cradle on top, in which position the operation is repeated for drilling and reaming the opposite side.

The boring fixture for V-eight cylinder blocks shown set up in a Heald machine, Fig. 6, is arranged to clamp the work hydraulically, a method which is very rapid and positive, offering many possibilities in the field of fixture design. The blocks are fed down a conveyor located at the right, but not shown, and then slid on to the fixture

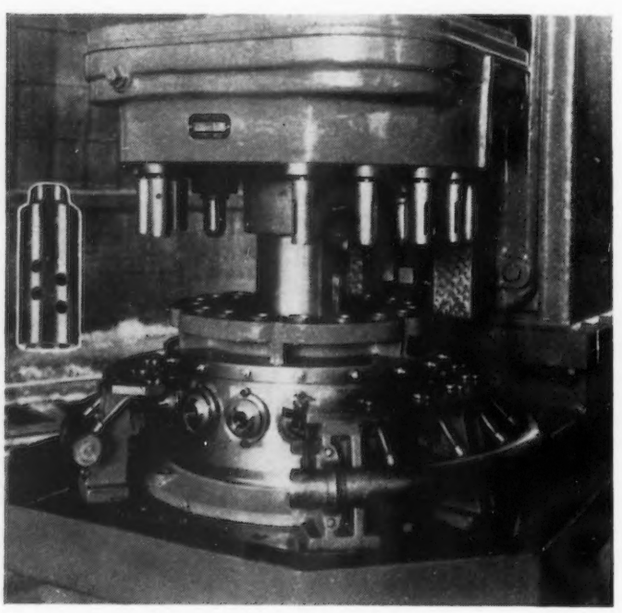

FIG. 8—This drilling fixture is entirely special and entails automatic indexing of table and individual indexing of collet chucks about radial axes.

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which is located at an equal height. At this stage of loading, however, the fixture cradle is swung over about 45 deg. from that shown, so that the ledge at the right is in a horizontal plane. With the work in place, the cradle is indexed to position one cylinder bank horizontally and in correct relation for boring, as illustrated. After the finish boring has been completed, the block is transferred into a machine on the opposite side of the conveyor, where the opposite bores are finished, thus eliminating the necessity of turning the work around. Set-ups such as this offer maximum production possibilities and naturally represent advanced principles of tool engineering.

Illustrated in Fig. 7 is an interesting set-up for the contour milling of counterweights as used on radial aircraft engine crankshafts. This operation has made possible the milling of the complete outer surface of these irregular pieces in one setting. Heretofore, to complete this surface required four separate operations and expensive form cutters. The fixture holds two pieces, which are located from two large holes, clamping being through C-washers and bolts. In back of the fixture, on the same work spindle, is located a master cam somewhat larger than the work. The horizontally operated cutter slide, controlled hydraulically, has a roller located to the rear of the cutter spindle which in turn engages the master cam while the spiral cutter contacts the rough-forged work pieces. The machine is started by a push button and one complete turn of the work completes the contour operation.

A unique combination of production tooling is represented in the illustration, Fig. 8, showing a multiple spindle vertical drill set up for the drilling of 16 holes located radially around the periphery of shell sleeves. In this case, the entire machine was a tooling project that combined a welded base and column, an automatic indexing fixture, and a multiple spindle drill head. The head is mounted on a Barnes self-contained hydraulic feed unit that slides vertically on the column, the cycle being continuous and automatic. The large plunger in the center of the head is provided with a cam face so that on the upward stroke, the fixture is indexed one station. At the same time, through bevel gearing, all the collet spindles also index automatically about horizontal axes, so that the work pieces are correctly positioned for the drilling of the next holes. The operator need merely load and unload the work-pieces at the two front stations of the fixture. A set-up of this kind clearly illustrates the possibilities obtainable by the application of advanced tooling practice, combining of course some principles of machine design, since in this case one machine operator is capable of producing more than was formerly obtained by several operators.

New Plastic and Metal Adhesives

TWO adhesive solutions made of Vinylite resins that produce unusually strong, impact-resistant, metal-to-metal or phenolic-to-phenolic bonds have been developed by the Plastics Division, Carbide & Chemicals Corp. They are thermoplastic cementing agents of high quality and can be used for assembling either molded or laminated phenolic materials.

Designated as XL-5041 and XL-5075, the former adhesive is a 24.5 per cent solution of a modified polyvinyl acetate in toluol and the latter a 28 per cent solution of the same resinous material in methyl acetate. Both produce the same strong bonds, and the choice of which to use depends only upon the speed of drying required. The XL-5075 adhesive dries considerably faster.

In using these new adhesives on molded phenolic plastics, the surface of the molded part is first cleaned by washing with ethanol or toluol and the thinned adhesive solution is roll-coated or sprayed on either one or both of the surfaces to be joined. The parts are then placed in position in a jig, pressure is applied, and the assembly is heated,. cooled under pressure, and the bonded parts are released.

For bonding laminated phenolics to each other, to molded phenolics, or to metal, the same general procedure is used. The modified polyvinyl acetate adhesives can only be used, however, after the phenolic bond of the laminate has been cured. Partial curing during adhesion or a combination of the curing and thermoplastic fusion processes does not result in satisfactory results.

The bond strength of the new Vinylite adhesives is remarkably high. Tension tests of metal samples bonded indicate a shear strength of the order of 6000 lb. per sq. in. In addition, the impact strength is better than that obtainable with regular grades of polyvinyl acetate, parts bonded with the modified adhesives being able to withstand sharp blows without injury.

▲ ▲ ▲

A. H. D'ARCAMBAL

President, American Society of Tool Engineers and consulting metallurgist, Pratt & Whitney Div., Niles-Bement-Pond Co.

E. W. DICKETT

First vice-president, A.S.T.E., and proposal engineer, Sundstrand Machine Tool Co., Rockford.

E. A. RUTZEN

Second vice-president, A.S.T.E., and assistant factory manager of Evinrude Motor Div., Outboard Marine Mfg. Co.

Tool Engineers to Stage Exhibit and Meeting in Detroit, March 24-29

THE third Machine and Tool Progress Exhibition to be held under the auspices of the American Society of Tool Engineers is scheduled to open at Convention Hall, Detroit, on Tuesday, March 25. The 1941 show will be the largest held since by the early part of the month over 240 companies had applied for show space and it was expected that by the opening date the number would exceed 250.

During the last show, which was held in the same place in 1939, more than 25,000 executives, engineers and production men registered for the exhibition and accompanying technical sessions. If the rapidly growing interest in the exhibition with its close relationship to the defense program is any indication, this previous record will be far exceeded, despite the press of production duties on the part of these men.

The entire theme of the show and of the technical sessions is production of defense items, and as far as possible the exhibits will be of an educational nature. Many tools and machines will be shown for the first time. On the opposite page is given the technical program for Tuesday, Wednesday, Thursday and Friday nights. No technical sessions are scheduled for the daytime, which is left open for plant visitations and for examination of the exhibits.

A special preview dinner is to be given on Monday night to an invited number of the country's prominent executives, engineers, educators and army and navy officers engaged in national defense preparations. The principal speaker at this dinner is to be Major General Charles M. Wesson, Chief of Ordnance, United States Army, whose subject will be, "The Job Facing Industry in Arming This Nation." The toastmaster will be L. Clayton Hill, manufacturing manager, Murray Corp. of America, who will be introduced by A. H. d'Arcambal, president of the A.S.T.E.

Most of the society officials on the exhibit committee, which is responsible for approving all exhibits, especially from the standpoint of their interest and value to national defense production, are engineers of companies in the Detroit area now tooling up for defense. Frank A. Shuler is chairman of this committee and he is assisted by William A. Smila, Luke E. Beach and Frank R. Crone, who is also treasurer of the society. Responsible for the program are James R. Weaver, of Westinghouse, Walter F. Wagner and Homer Bayliss. Claude L. Hause, chairman of the Detroit Chapter, A.S.T.E., is in charge of plant inspection trips and transportation.

The show will be open to all members of the metal working industry interested in defense tooling. Samples of typical defense items will be on display.

C. O. HERSAM

Secretary, A.S.T.E., and consulting tool engineer and designer, Philadelphia.

FRANK R. CRONE

Treasurer, A.S.T.E., and chief tool designer, Lincoln Motor Car Division of Ford Motor Co.

FORD R. LAMB

Executive secretary, A.S.T.E., and largely responsible for the successful 1938 and 1939 shows.

Program of Technical Sessions, A.S.T.E. Annual Meeting

Tuesday, March 25—8 P. M.

Subject—Aircraft Production.

Chairman—Walter F. Wagner, master mechanic, Lincoln Motor Car Co.

C. W. Van Ranst—chief aircraft engineer, Ford Motor Co., "*Aircraft Engine Design & Production.*"

Louis Biehler, assistant chief tool designer, Vultee Aircraft, Inc., "*Tooling for Fuselage Production.*"

C. C. Carlton, acting director, Automotive Committee for Air Defense, will lead discussion from the floor.

Wednesday, March 26— 8 P. M.

Subject—Naval Ordnance Production.

Chairman — Homer C. Bayliss, co-manager Detroit branch, Motch & Merryweather Machinery Co.

Joseph A. Davies, chief planner and estimator, Naval Gun Factory, Washington, "*Planning for Production of Naval Ordnance Units.*"

E. M. Sims, president, Metal Forming Corp., Elkhart, Ind., member board of directors, National Association of Manufacturers, member, National Defense Committee, "*Problems of Production of Naval Ordnance Units.*"

Thursday, March 27—8 P. M.

Subject—Industrial Education.

Chairman—Herbert D. Hall, president, Herbert Hall Co., Newark, N. J.

P. W. Brown, assistant works manager, Wright Aeronautical Corp., Paterson, N. J., "*Industry's Need in Skilled Help.*"

Carl A. Gray, president, Grenby Mfg. Co., New Britain, Conn., "*How Connecticut Solved the Industrial Training Problem.*"

J. R. Weaver, manager, Louisville Ordnance Division, Westinghouse, and past-president, A.S.T.E., will describe the work A.S.T.E. is doing for industrial training and will lead discussion from the floor.

Friday, March 28—6.30 P. M.
Book Cadillac Hotel

A.S.T.E. ANNUAL DINNER AND MEETING

Chairman—A. H. d'Arcambal, president, A.S.T.E., consulting metallurgist, Pratt & Whitney Div., Niles-Bement-Pond Co.

Installation of new A.S.T.E. national officers.

Speaker—L. R. Pennington, administrative assistant to J. Edgar Hoover, director, Federal Bureau of Investigation, "*How to Prevent Sabotage to Our National Defense Program.*"

Sessions will be held at Convention Hall, Detroit, unless otherwise noted.

A.S.T.E. 1941 Machine & Tool Progress Exhibition List of Exhibitors

Abrasive Co., Philadelphia; grinding wheels and abrasives ....Booth No. 113

Abrasive Dressing Tools Co., Detroit; diamond lapping machines for sharpening diamonds .....Booth No. 327

Allen Mfg. Co., Hartford, Conn.; socket screws .....Booth No. 220

Allis-Chalmers Mfg. Co., Milwaukee; electric motors from 1 to 200 hp., Texrope V-belt drives, coolant pumps .....Booth No. 145
Weld-O-Tron welders .....Booth No. 391

American Broach Sales Co., Detroit; display of tools .....Booth No. 247

American Machinist, New York; copies of "American Machinist" .....Booth No. 176

Ames Co., B. C., Waltham, Mass.; Ames gages and dial indicators .....Booth No. 367

Ampco Metal, Inc., Milwaukee; non-ferrous alloys .....Booth No. 357

Anderson & Sons, Westfield, Mass.; imprinting machines, etched and lithographed metal products .....Booth No. 291

Apex Machine & Tool Co., Dayton, Ohio; quick change drill chucks and collets, safety friction tap chucks and collets, stud setters, nut setters, universal sockets, tension wrenches, universal joints, screw driver bits .....Booth No. 172

Armstrong Bros. Tool Co., Chicago; machine shop tools ...Booth No. 274

Atlas Press Co., Kalamazoo, Mich.; lathes, drill presses, arbor presses, shaper, milling machine and saws .....Booth No. 360

FRANK A. SHULER

Chairman, Exhibit Committee, A.S.T.E., and general master mechanic, Highland Park plant, Chrysler Corp.

WILLIAM H. SMILA

Exhibit Committee and master mechanic of the Chrysler Division, Chrysler Corp.

LUKE E. BEACH

Exhibit Committee and master mechanic, Detroit Transmission Division of General Motors Corp.

Automotive Industries, Philadelphia; automotive publications. Booth No. 226

Barber-Colman Co., Rockford, Ill.; small tools ..... Booth No. 100

Barnes Co., Inc., W. O., Detroit; hack saw blades and metal cutting band saws .... Booth No. 135

Black & Decker Mfg. Co., Towson, Md.; portable electric tools and accessories, drills, portable grinders, sanders, screw drivers, shears, in both universal motor types and high cycle motor types ..... Booth No. 268

Black Drill Co., Cleveland; newly developed drills for drilling steels up to Rockwell 70 .... Booth No. 351

Blake Co., Edward, New Centre, Mass.; Black Diamond precision drill grinder, J-B tap grinders, tool holders ..... Booth No. 257

Blank & Buxton Machinery Co., Jackson, Mich.; index vertical milling machines ..... Booth No. 159

Boggis & Co., Henry P., Cleveland; Hybco tap sharpening equipment ..... Booth No. 216

Boice-Crane Co., Detroit; drill presses and tapping machines, wood and metal cutting band saws, power tools ..... Booth No. 355-A

Boyar-Schultz Corp., Chicago; profile grinders, screw machine box tools, and special bolts... Booth No. 119

Bridgeport Machines, Inc., Bridgeport, Conn.; turret milling machines, high speed milling attachments, duplicating attachments ..... Booth No. 353

Bristol Co., Waterbury, Conn.; complete line of socket screw products ..... Booth No. 397

Brown & Sharpe Mfg. Co., Providence; machinists, tools, cutters, pumps, magnetic chucks. Booth No. 104

Bruning Co., Inc., Charles, Detroit; printing and developing machines ..... Booth No. 182

Brush Development Co., Cleveland; brush surface analyzer and generalizer ..... Booth No. 388

Campbell, Andrew C., Div., American Chain & Cable Co., Bridgeport, Conn.; Cutamatic wet abrasive cut-off machine and nibbling machine ..... Booth No. 205

Carboloy Co., Inc., Detroit; cemented carbide tools and dies. Booth No. 124

Carborundum Co., Niagara Falls, N. Y.; Carborundum and Alox-ite grinding wheels and hone sticks ..... Booth No. 203

Carpenter Steel Co., Reading, Pa.; tool steels ..... Booth No. 363

Charron Engineering Sales, Detroit; Hanna pneumatic and hydraulic riveters, pneumatic and hydraulic cylinders, air valves, Electro-Lift hoists..... Booth No. 234

Chicago Mfg. & Distributing Co., Chicago; CMD helical groove lathe center, lathe center point lubricant, mechanical air separator and blow valves ..... Booth No. 332

Chicago Metal Hose Corp., Maywood, Ill.; flexible metal hose and bellows ..... Booth No. 249

Chicago Rivet & Machine Co., Chicago; tubular and split rivets, automatic feed rivet setting machines ..... Booth No. 114

Cincinnati Tool Co., Cincinnati; mechanics hand tools, motor driven chisel tester, electric display table ..... Booth No. 322

Circular Tool Co., Providence; circular metal cutting saws, combination center drills, center reamers ..... Booth No. 163

Consolidated Machine Tool Corp., Rochester, N. Y.; self-opening die heads, milling cutters, Modern-Magic chucks, stud setters, collapsible taps ..... Booth No. 348

Conover-Mast Corp., New York, N. Y.; copies of "Mill & Factory" ..... Booth No. 275

Continental Machines, Inc., Detroit; Doall Models V-26, V-36, and ML, surface grinder, Doall precision saw blades, Speed-master variable speed pulley.. Booth No. 358

Crafts Co., Inc., Arthur A., Boston; industrial diamonds, tungsten carbide tools, gages .... Booth No. 261

Curtis Industrial Designing Engineers, Detroit; the metals: Cerrobend, Cerrobase and Cerromatrix and their uses .... Booth No. 369

Davis Boring Tool Div., Larkin Packer Co., Inc., St. Louis; boring tools, facing tools, reamers ..... Booth No. 263

Delta Mfg. Co., Milwaukee; single and multiple spindle drill presses, carbide tool grinders, pedestal grinders, cut-off machines, metal cutting band saws ..... Booth No. 139

Detroit Power Screwdriver Co., Detroit; magazine feed power screw drivers ..... Booth No. 155

Detroit Universal Duplicator Co., Detroit; duplicator-lathe combination ..... Booth No. 403

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Modern Machine Shop, Cincinnati, Ohio; publication exhibit.Booth No. 233
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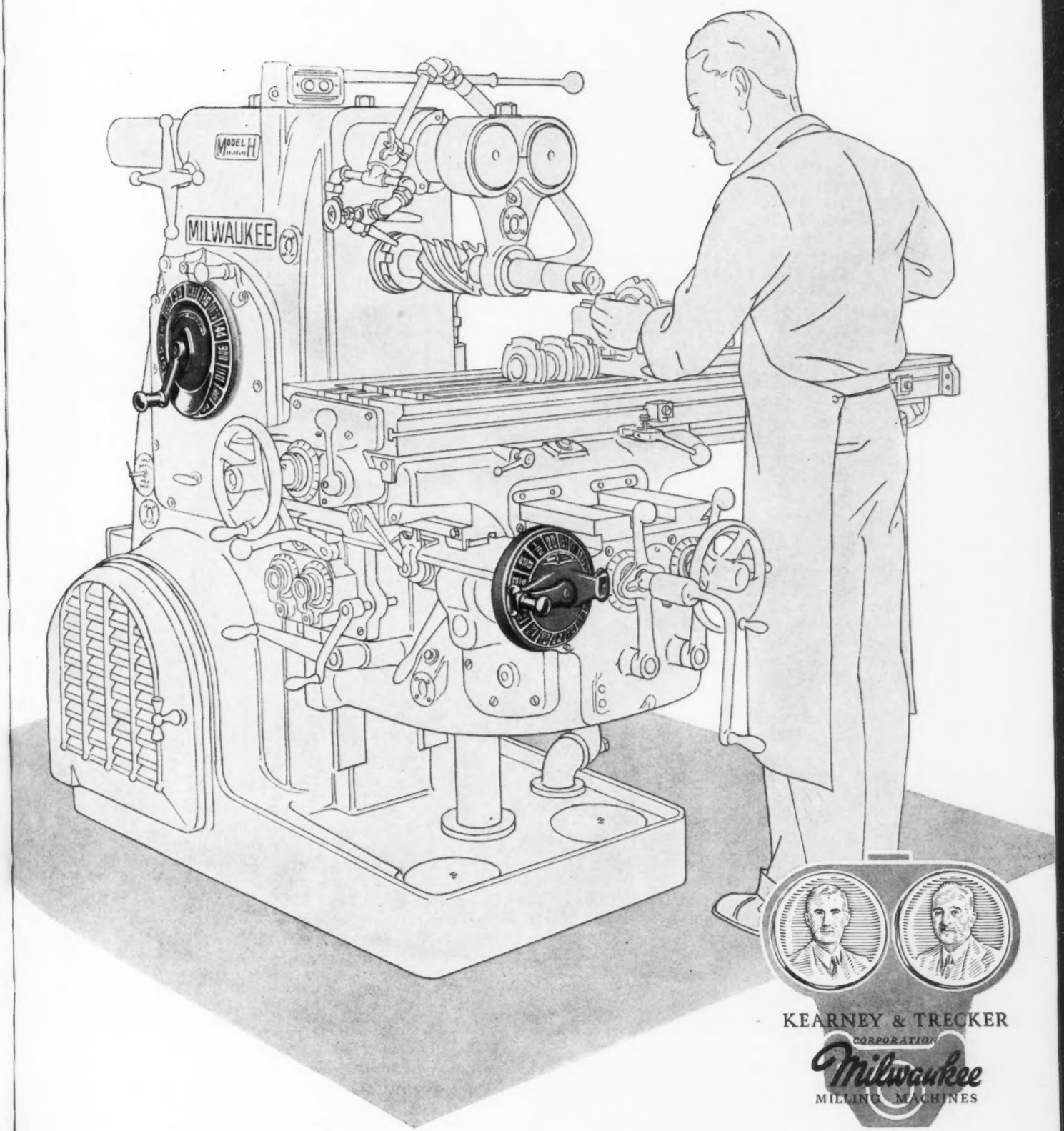

MILWAUKEE MILLING MACHINES

On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• Shortages of materials causing shutdowns in automotive parts plants . . . Assembly lines may eventually be affected, though production of cars has hit highest level since spring of 1937 . . . Ford again building six-cylinder engine.

DETROIT — A saving sense of humor is the only thing keeping some automobile men "from going off the deep end," said one of Detroit's executives the other day. He was referring to the extremely tight situation on materials and the constant crop of headaches that have been created by circumstances. Plant shut downs have been occurring because of the metal situation, in particular. Suppliers have been hit first; for instance, Gerity-Adrian Corp., which supplies auto trimmings and die castings, has been forced to lay off several hundred men within recent weeks because of the shortage of zinc and nickel, and this is only one of dozens of similar cases. Some auto plants have failed to operate night shifts because of shortages of parts and, as reported last week, several auto plants have been closed for a day at a time.

Not always are actual shortages involved. Sometimes manufacturers just reach the end of their tether; one day it may be an embarrassing shortage of pistons, the next day pistons are available but anodizing is the bottleneck. Follow-up men clear up the piston situation, then find that die castings, plating, stainless trim, or some other item is the bottleneck.

Right along they are eating into the banks of parts and sub-assemblies that provide the necessary cushion for any manufacturing establishment. It has been predicted freely that within the next two weeks some really critical developments will occur. One of these is the possibility of serious shutdowns—much more serious than the one-day shutdowns that have occurred so far.

Substitutions Being Made Quickly

Every effort is being made to make substitutions quickly to avoid the events predicted above. Chrysler has already placed orders for cast iron or cast steel pistons from one supplier and there are indications that an attempt will be made to complete the changeover from aluminum pistons while the present model run is being completed; in some plants, however, the changeover will not be made until 1942 models are brought out (if enough secondary aluminum can be found to carry out the present model program).

It is no easy matter to substitute the heavier cast iron or steel pistons for aluminum. Some typical weights of aluminum pistons are: Plymouth—14.40 oz.; Buick—13.78 oz. and 17.94 oz. for different size pistons. In contrast the Chevrolet cast iron pistons (with bushings) weigh 26.8 oz. and Pontiac chrome-nickel-iron pistons weigh 27.00 oz. for the six-cylinder engine and 24.62 oz. for the eight-cylinder engine. Ford has a most interesting piston setup, using cast steel pistons which weigh only 11.82 oz. in the Ford engines and 12.70 oz. in the Lincoln engines.

Several instances of immediate changeover from die cast radiator grilles to steel stampings are reported. In at least one case the dies have already been made and the changeover in production is expected this week. The die casting situation threatens the extermination of the dual carburetor setup which Buick initiated last fall.

Other die castings which are forced out of the picture include about 30 lb. on the Ford tractor. These are mostly aluminum but include also some magnesium castings such as those used for the handbrake quadrant. Ford made extensive use of these light metals for radiator grilles and structural parts such as the steering column casting.

It can be said almost as a generality that aluminum heads for engines are out of the picture now in the few cases where they have been used. It means changes in compression ratio and engine performance, but there is no other solution to this problem—anyhow, the difference is nominal, compared with the piston problem where reciprocating weight will be greatly increased, necessitating important changes in connecting rods and bearings, possibly also in crankshaft design.

Plastics Used for Some Parts

Chrysler is most advanced probably in its program for substitution of plastics. Molds for die casting machines are being converted to handle plastics and a widespread program for the manufacture of plastic garnish moldings, escutcheons and decorative panels is under way. General Motors has undertaken tests of fuel pumps made of a plastic in place of a die casting. Batteries of these fuel pumps are undergoing tests now to determine their characteristics. It is possible that the same material may be used for carburetor bases. That change probably would be preferable to any return to cast iron, because the die cast and plastic parts can be molded to require a minimum of machining. Any change back to cast iron would require extensive machining, and the present machine tool delivery situation precludes getting the necessary equipment. Originally cast iron was dropped from use for many parts like these because the die castings did eliminate much machine work.

Since electroplated plastics were mentioned some time ago in this column, it has been learned from one

R.S.V.P.

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DIVISION NILES-BEMENT-POND COMPANY

of the automobile companies that the Metoplast Corp., New York, has supplied samples of such material. Where bright metal finish is required, as on radio grilles and possibly on radiator grilles, this material may see use.

The most pessimistic viewpoint on the substitution of plastics comes from one or two of the plastics men who have been called on for emergency advice in cases where quick substitutions are necessary. They have expressed fear that plastics will be misapplied by over-enthusiastic and under-informed manufacturers and that as a result plastics will get an undeserved black eye. Certainly in many instances the normal economic factors are being overlooked. In such cases the use of plastics will be only "for the duration" of the present difficulties and shortages of other materials. Of plated plastics, it has been said that as long as plating materials are difficult to obtain, the situation isn't being improved at all by changing to a plastic base material.

In the pattern of "off again, on again, gone again, Finnegan," Ford has resumed manufacture of the six-cylinder engine which has become almost as legendary as Railroadman Finnegan's train that jumped the track so often.

And like Finnegan, who simplified his report to the 'nth degree, we'll just say "on again."

Assemblies were started again last week at the Rouge plant with the immediate production goal set at 600 a day. The engines are slated for use interchangeably in passenger cars, commercial cars and trucks and are in addition to the line of engines which now includes a four-cylinder plant introduced last fall for commercial vehicles, the famous V-8, 85 hp., and the Mercury V-type engine which is used in some instances in commercial vehicles.

Some of the sixes built earlier in the year have gone into military vehicles, it is believed, but there has been no explanation for the shutdown order issued after production of the six-cylinder engine was started initially.

Announcement of the six-cylinder option is likely to be made about April 1, about the time that another manufacturer will introduce a long-planned new model. The new car will be the Packard six, for which factory officials have been formulating introduction plans during the past week. It has been confirmed that the car will be shown to newsmen soon, after which the veil of secrecy will descend until public announcement is made.

Automotive Workers Coin Many New Terms

• • • The automotive glossary is enriched by contributions from Lincoln which include "send me a blue goose with a bunch of bananas" and "have him bring along a fish pole for this chatterbox." For interpretation, the Lincoln plant contribution includes definitions: a blue goose is a man who makes special deliveries of assembly materials when regular stocks run low; banana means bumper guard, while chatterbox and fish pole indicate a car radio and aerial. In the shop the Lincoln-Custom is known as Queen Mary or Big Bertha, while the last car off the assembly line at the end of the model year is "the caboose." Other shop expressions, including some heard only in the Lincoln plant, include: Rear view mirror—cheater; sun visors—blinders; outside body trim—ginger bread; floor carpet—the rag; double-pointed molding spring clips—grasshoppers; rear end body section—balloon assembly; overdrive — booster; metal ring around Lincoln push-button door controls—horse collar; direction indicator—flash or firefly; sealing material—dum dum; battery—juice box; low gravity batteries for service in hot climates—L.G.B.; carburetor—pot; exhaust—snort pipe; crankshaft—wrinkle rod; tire—hoop; inner tube—wind bag; car equipped with right hand drive for export — foreigner; extra heavy springs for rough road service—bumps.

Among the operations with trick names is the installation of the engine with the aid of an air hoist, called "swinging it." When a worker welds seams in the unit-body-and-frame, he "sews her up." A test driver who takes a curve at high speed "bends it" and when he applies the brake he "drags his foot." Other job designations are inspector—the umpire; body finish sprayers—kalsominers; groups which move heavy materials—bull gang; chassis lubricator—grease ball.

Most recent purchase authorizations by Ford have brought the total for the company's vehicles to 900,000 cars and trucks, cumulative since the first of the model season. This indicates production and production plans substantially in excess of a year ago when purchase authorizations were in the vicinity of 750,000 units, it is recalled.

Despite the difficulties that have been encountered in obtaining materials and despite the occasional shutdowns that have been referred to above, automobile production in the past week hit its highest level since the spring of 1937. Assemblies in the week just ended totaled 131,410 compared with 125,915 in the previous week, according to Ward's Reports, Inc. Output in the corresponding week of 1940 was 105,720. The 1937 spring level, which current production is approaching, hit a peak of 141,485 late in April.

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Chicago

• • • **Pay increases** are given Stewart-Warner employees who now act as instructors for new men in the shop. Apprentices on automatic screw machines start on a single machine and gradually are given additional machines until they are operating four machines when they are considered fully experienced. At that time the pay increase is granted the employee-instructor under whom the apprentice was trained.

↓ ↓

South Bend, Ind.

• • • **In Studebaker's** annual report to stockholders, Paul G. Hoffman, president, and H. S. Vance, board chairman, asserted that armament needs come first, though "it does not appear as yet that a restriction of automobile production is necessary for that purpose." Referring to the three aircraft engine plants Studebaker is building in Ft. Wayne, South Bend and Chicago, the executives said that every effort was being made to expedite the construction of the plants but that it "cannot be anticipated that any considerable production of aeronautical engines can be obtained before the end of the year."

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Washington

BY L. W. MOFFETT
Washington Editor

• Rush of labor leaders to cash in on emergency found threatening building of "Arsenal of Defense" . . . Administration said to favor moderate wage increases . . . Correspondence shows country hostile to strikes.

WASHINGTON — Certain it is that there will be a shortage of steel and of all other defense materials if a halt is not called soon on the rampage of organized labor. Unless a check is quickly put on the mad rush of labor leaders to cash in on the emergency with which the country is faced neither the lend-lease law nor any other act will be of any use. The United States cannot be an "arsenal of Democracy" if the arsenal is closed down by strikes or its operations dislocated by threats of strikes.

Instead there will be an arsenal of confusion and frustration. The outwardly complacent attitude of Washington that the labor situation is not serious reflects timidity of action, not the actual concern that exists within the Administration. Comparisons of the present labor turmoil with previous periods of national stress are poor comfort and are misleading. When some two dozen or more defense plants are closed down, as was the situation at this writing, with threats of widespread strikes throughout the land, involving both large sections and small units of defense industries, efforts to show that previous labor tie-ups were more serious than prevalent conditions, are hollow and futile. At present Washington impatiently feels that the country at large is by no means aware of the danger that confronts the country. What amounts to an intense national campaign by radio, press and the public hall long has been under way to arouse the country to awareness of threats to American democracy and united, vigorous action is being urged to beat back and destroy those threats.

Industry is told to produce and to produce at topmost speed and volume. Not one minute, as a prominent government official has said, must be lost. Yet days, weeks and months are being lost despite the full response of industry in its desire to turn out war materials at its maximum capacity, both old and new. One can readily imagine what would happen and properly so to any industry or any single plant that held back, or closed down just to knock off for a day or so. It would deservedly be cracked down on and taken over by the government.

Hourly Wages Highest on Record

But organized labor, which has been so bountifully served by the Administration, rewards it and the nation by going on a stampede of strikes and strike threats, taking advantage of the emergency in an effort to enforce capitulation to its demands, many of which labor itself realizes are unreasonable. Wages now are rising faster than prices. Hourly earnings are the highest on record, exceeding by about 25 per cent those of 1929.

That labor deserves good wages and working conditions is so obviously true that the statement is trite but its demands are going far beyond that limit and they are all the more reprehensible because they are being made under duress occasioned by national emergency. It is a safe conclusion that great ranks of labor would not themselves condone the action of their leaders if it was not for fear and coercion at the hands of leaders. Much is heard by labor leaders about the right of labor to share "war profits." Isolated cases excepted, labor is sharing what they call war profits, a term which is largely mythical when it is considered that heavy taxation will reduce these profits almost to the zero point.

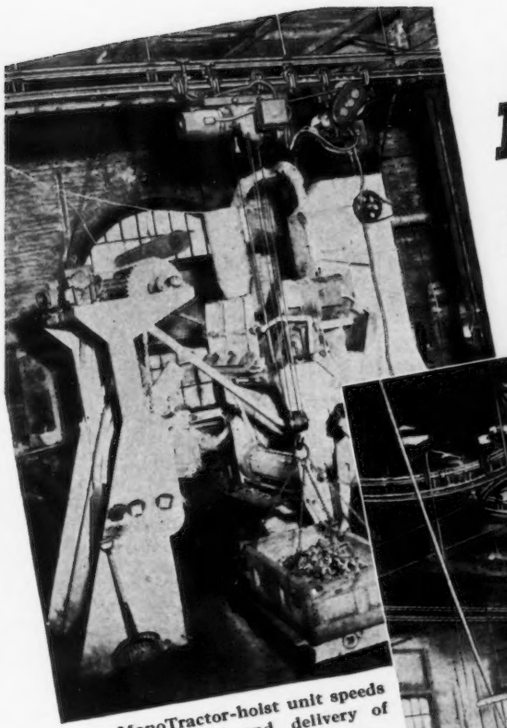
But aside from this if there is a letdown where present capacity operations now prevail—and labor threatens further letdowns and shutdowns—the profits will be wiped out at once. This is true particularly of mass production industries such as the steel and automotive industries. Any substantial decline in the operating rate will see in increasing ratio a drop in profits and were wages to be advanced out of proportion to this relationship the result would be deficits unless the only alternative of higher prices were adopted. The steel industry doesn't want to increase prices. It shares with the government apprehension on an upward spiral of prices, living costs and inflation. The average hourly wage in steel is 86c. Its annual payroll is at the rate of about $1,100,000,000.

Moderate Wage Increases Ordered

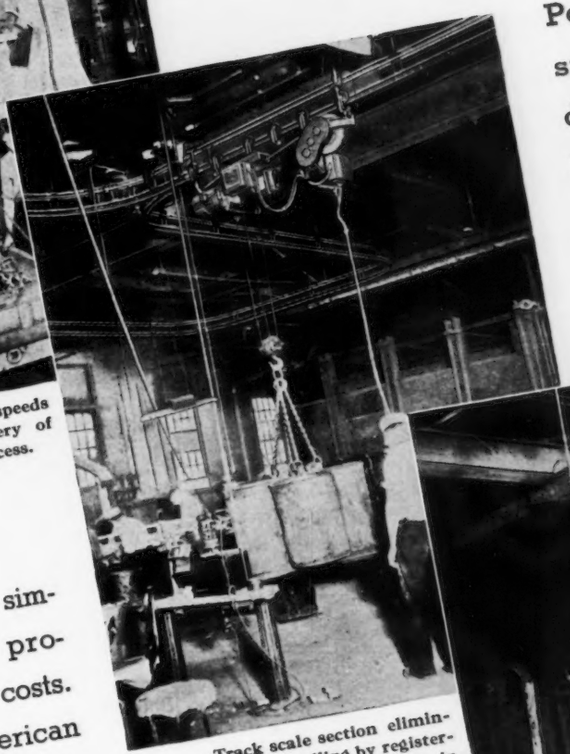
The Administration, while hoping to "restrain" wages, is said to be sympathetic to "moderate" wage increases particularly for employees in the lower brackets but at the same time to be strongly opposed to price rises. Whether it can manage to limit the wage increase without at the same time controlling prices is the not enviable problem to be met.

This assumes, because it is believed justified, that the labor situation will be laid at the door of the White House and that events will have to take place soon if labor is to be restrained and the defense program executed with expedition and efficiency. The prevailing view is that the White House will seek to placate labor by encouraging substantial though not complete compliance with its demands, and that industry either will be urged not to increase prices—or at least to hold them down as much as possible—or

MECHANIZE your simple jobs!



MonoTractor-hoist unit speeds up removal and delivery of castings to cleaning process.



Track scale section eliminates rehandling by registering weight of castings in transit.

Heavy loads are easily and quickly moved by power operated equipment.

Power operation will speed up your production and cut down handling costs.

•

It's the time-consuming, simple jobs that tie up production and pile up costs. Hence, when an American MonoTractor with electric hoist takes over the handling operations, bottlenecks disappear, materials move smoothly between process and costs inevitably fall.

With their specialized experience, American MonoRail engineers are often able to discover hidden possibilities for the application of simple handling systems that bring an immediate return from a small investment. This service is available from district offices located in every industrial center.

•

THE AMERICAN MONORAIL CO.

13103 ATHENS AVENUE, CLEVELAND, OHIO

•

How Problems are Solved!

Write for copy of this "Blue Book" containing hundreds of illustrations showing solutions to a wide variety of handling problems.

left to work out its own salvation. The general assumption is that the board set up by the President will attempt to work out negotiations when employers and employees cannot agree on terms. This despite the rising anti-labor sentiment in Congress and big talk of legislation to control labor.

Meanwhile, labor strategy to sell the public at large on the idea that the blame for disputes lies with industry is not proving successful if the heavy correspondence coming from the country to members of Congress is an index. The bulk of this correspondence reflects a definitely hostile attitude toward labor leaders.

↓ ↓

• • • **An aluminum** extrusion plant for the production of defense and munitions materials, principally for aircraft and munitions, was scheduled to be put in operation last week by the Reynolds Metals Co. in Louisville. About 4,000,000 lb. of extruded alloy aluminum shapes, tubes and bars is expected to be the production rate by July 1.

Started last October as a two-bay mill, but increased to six bays under government auspices, the new plant when in complete production will include four large melting furnaces from which ingot aluminum will be cast into billets for the extrusion presses. Metallurgical and chemical laboratories will make the plant a completely self-contained mill—handling aluminum from the ingot to finished product.

The building was erected through the Defense Plant Corp., RFC subsidiary, at a cost of $2,500,000. The company also is constructing a $17,500,000 rolling mill and structural plant, and a 40,000,000-lb. ingot plant at Lister, Ala.; and a 60,000,000-lb. ingot unit in the Bonneville-Grand Coulee power region of the Columbia River in the Pacific Northwest.

A statement released by company representatives in Washington described the Reynolds virgin aluminum plants as the country's "second source of ingot supply."

THE BULL OF THE WOODS — BY J. R. WILLIAMS

AT LAST HE'S GOT WISE -- HE FOLLERED TH' OL' WATCHMAN ON EVERY ROUND FER YEARS! IT TOOK HIM ALMOST A LIFETIME TO FIND OUT IT WAS FOOLISH FOLLERIN' PEOPLE.'
YEH, IT TOOK ME A LIFETIME TO FIND IT OUT, TOO! I WAS FOLLOWIN' TH' WRONG GAME, AN' NOW, IF I DON'T FOLLOW, I DON'T EAT.'
10 G
REDRAWN BY REQUEST
RETIRED
3-28 J.R.WILLIAMS
REG. U. S. PAT. OFF.
COPR. 1941 BY NEA SERVICE, INC.

Bidders To Get Wage Changes In Advance

Washington

• • • Prospective bidders on government contracts are to be advised in advance whether there may be a change in the legal wages of their industries and when the change, if made, will go into effect. This new government policy, announced by Donald M. Nelson, OPM Director of Purchases, was adopted at a conference of officials of the Wage and Hour Division and the Division of Public Contracts, Department of Labor, with officers of the Quartermaster Corps and the OPM Division of Purchases.

The machinery for setting industry minimum wage rates under the Wage-Hour and Walsh-Healey Acts will remain unchanged, but hereafter dates on which wage determinations will go into effect will be set after consultation between officials of the Labor Department and the Division of Purchases.

Commercial Airlines To Get Equipment

Washington

• • • **Commercial airlines** were assured last week that despite the requirements of the defense program they will continue to receive parts and equipment necessary for the efficient operation of their services. OPM Director General William S. Knudsen said in a formal statement that government officials are "convinced of the necessity of maintaining the existing quality of air transportation."

Answering the controversial question whether the military aircraft program might tend to lower the operating efficiency of commercial airlines, Mr. Knudsen said:

"It is obvious, of course, that the military airplane program is of paramount importance in the National Defense effort. But it is a matter of fundamental policy, determined when civilian aircraft priorities were established, that the airlines shall continue to receive delivery of the motors, propellers, instruments, spare parts and material necessary for maintenance and overhauling operations."

OPM Issues Rules On Aluminum Scrap

Washington

• • • **Instructions for** disposition of large quantities of high-grade aluminum scrap, issued by the OPM's Production Division on March 6, set forth five rules for military aircraft manufacturers to follow, requiring each sale to be reported to the OPM including information as to weight, selling price and the buyer.

In a letter directed to aircraft manufacturers, Edward R. Stettinius, Jr., Director of Priorities, laid down these instructions:

1. Unpainted and unlacquered strong alloy scrap, in the form of sheet clippings, mutilated sheets, tube ends and mutilated tubing, extrusion ends and mutilated extrusions shall be segregated as to alloy regardless of temper according to five groupings set forth in the letter.

2. This segregation by alloy shall be rigorously carried out so that scrap from the above aluminum alloys is clearly and unquestionably identified without chemical analysis.

3. From the standpoint of the fabricator it is desirable that all scrap be received for toll fabrication in briquetted form.

4. Aluminum scrap thus segregated shall be returned for toll fabrication to suppliers of the original aluminum in approximate proportion to purchases of the original aluminum from the suppliers.

5. Any deviation from this plan of segregation shall be worked out in detail with the toll fabricator.

The letter, copies of which were sent to suppliers of aluminum with the request that they cooperate with the aircraft manufacturers in developing methods for segregating aluminum scrap, follows the OPM directions sent out last month that high-grade aluminum scrap be held for later return to the original source of supply.

The segregation as to alloy, referred to in paragraph No. 1, included group (a) 17S; group (b) Alclad; group (c) 24S; group (d) 24S Alclad; and group (e) 52S. The classification contained the additional instructions that "Alclad" products be separated as individual alloys.

The defense program of industrial production again emphasizes the critical need for a thoroughly reliable means of checking the lead of screw threads and rack teeth.

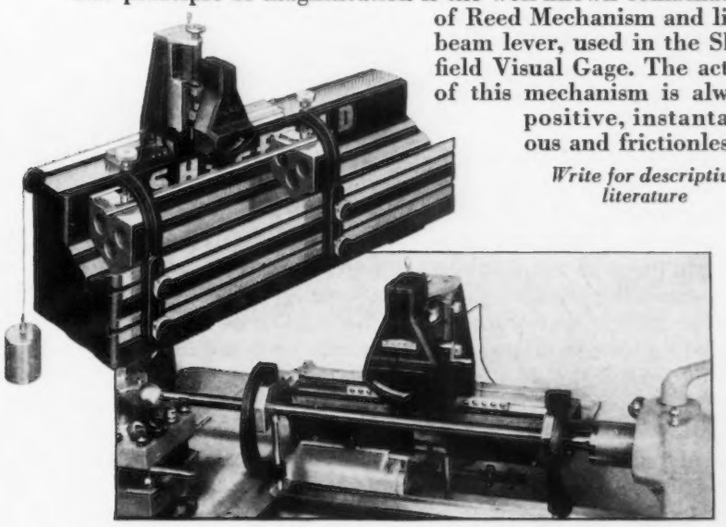
The Sheffield Thread Lead Checking Instrument is the ultimate in accuracy and speed—checking with precision gage blocks as the reference. And no special skill is needed, for anyone familiar with inspection procedure can handle this instrument.

There are two models, one for use on the bench, and a portable model which may be used on work still in the thread cutting machine, without removal.

The bench model handles screws up to 6″ in diameter and 30″ in length. The portable model handles screws from 1″ to 4½″ in diameter or from 2″ to 6″. Twelve inches of screw is checked at one setting by either model. For screws longer than that more than one setting is made.

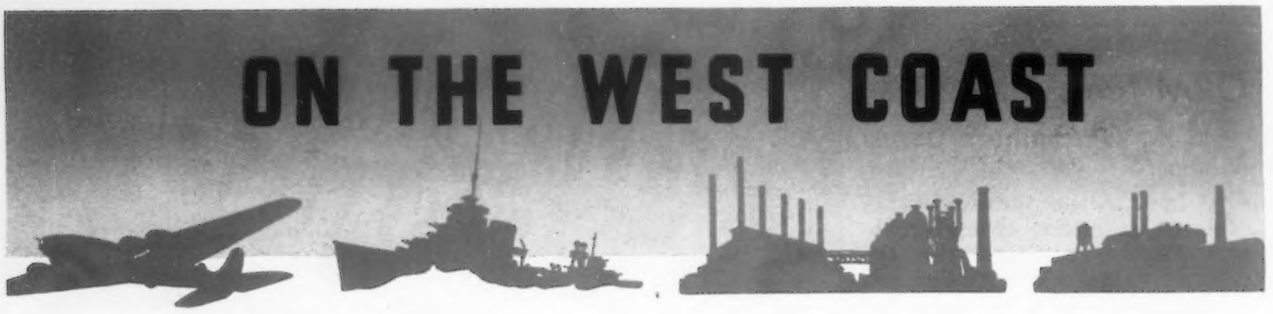
The principle of magnification is the well-known combination of Reed Mechanism and light beam lever, used in the Sheffield Visual Gage. The action of this mechanism is always positive, instantaneous and frictionless.

Write for descriptive literature



SHEFFIELD
GAGE CORPORATION • DAYTON, OHIO, U.S.A.
MASTER GAGEMAKERS

ON THE WEST COAST



• Small shops seek way to share in defense work . . . Employers' report reveals shackling of Harry Bridges . . . Scrap price differentials will relieve pressure on Coast mills . . . 20 strikes in San Francisco so far this year.

THE avalanche of national defense work that has descended in the last year on the heretofore industrially ingenuous Pacific Coast has by no means filled the available shop capacity, particularly that of smaller concerns.

The beginning of the war in 1939 found the Far West with a large number of medium and small sized industrial firms competing for orders in an area relatively undeveloped industrially. Some newly organized big concerns have grabbed juicy tidbits, but most of the small and medium sized concerns still have no contract chicken stewing in their pots.

OPM representatives have recorded hundreds of requests from small concerns for defense work and have referred some of them to governmental agencies, prime contractors, and large subcontractors. Some have been turned down altogether.

One barrier to the little man sharing in orders is his lack of financial responsibility. If his financial status meets requirements, he often is handicapped with rule of thumb engineering facilities, inability to prepare quickly bids, or, if he is tending his operations, he is likely to be behind the door when the jelly is passed out. Even the well-equipped, wideawake small firms are not able, alone, to make full assemblies, and it is these that aircraft manufacturers, particularly, are willing to farm out.

SUBCONTRACTING is most prevalent in Los Angeles County, the heart of the aircraft industry, where 8000 industrial firms are listed. For the ten major aircraft companies 300 firms are making parts. Six or eight prime contracts for ordnance have been let, but very few subcontracts. Very little subcontracting has been evident in shipbuilding, which has not yet gotten into full swing, or in the 25-odd quartermaster contracts for uniform, gas masks, radios and miscellaneous equipment.

Neither the small industrialists, nor, apparently, the OPM are happy about the situation. Both of them show signs of going into action. An OPM executive is scheduled to come to the Coast this week to study the feasibility of further spreading the work. The OPM, of course, is concerned with getting the work done as quickly and efficiently as possible, and its persuasiveness will be felt by contractors whose reluctance to farm out the work stems entirely from unwillingness to share the profits. Some firms reputedly have not farmed out the work because of an entirely understandable disinclination to play mother hen to future potential competitors. They, too, may feel the OPM lash.

Significant of industrial health is a plan, still in incubation, to help overcome the shortcomings of small firms wishing to share in defense work. The scheme is being hatched under the wing of the always active Los Angeles Chamber of Commerce, which would organize the small factories into a series of hanseatic groups to handle subcontracts. As groups these firms would be in a better position to receive financial assistance, would be able to undertake complete phases of manufacture, and would receive managerial, engineering, personnel, and purchasing services.

THIS does not solve the tougher shelled problem of helping the little fellows receive prime government contracts. In this case it would be necessary for one unit of the group to be of a financial dimension to satisfy government authorities, or a new corporation would have to be formed combining the assets and physical properties of all members of the group. The Los Angeles Chamber is considering establishment of a Washington bureau with big ears, eyes, and hands to be in on the scramble.

In the meantime, some of the larger prime contractors have been attacking the problem of unused capacity of small shops in their own way. Scouts have been beating the industrial backwoods for some time for certain kinds of machine tools, and, where a particularly large covey is flushed, have taken over an entire plants.

Now eyeing the possibility of ordnance manufacture in southern California are more and more oil country manufacturers, whose business has been on the dull side. Byron-Jackson Co., Los Angeles, oil tool and pump manufacturer, has taken a $4,000,000 contract for artillery and tank equipment.

In its annual report for the year 1940, the San Francisco Employers' Council, which bargains collectively

for 1785 employers, reports only 20 strikes in San Francisco during the year, but says that "it may be increasingly difficult to maintain industrial stability during the current year, owing to certain disturbing aspects of our national labor relations picture."

ATTENTION is called to the factors which have "cleaned up" the city from a labor standpoint. Much credit is given to the practice of a majority of the unions and employers of establishing a waiting or cooling-off period of approximately 15 days for the adjustment of disputes before a strike or lockout can take effect. A second important factor which has made for industrial stability has been the willingness of San Francisco employers to handle collective bargaining on an industry-wide basis, and to make individual sacrifices where necessary in the interests of the entire industry or the community of employers. Many cases might be cited to prove that joint employer action has proved an effective counterbalance to collective labor action, and this industry-wide bargaining might well serve as a model for adoption on a national scale.

Hidden obscurely in the report is a reference to an agreement that may cause Harry Bridges' eclipse as a prime waterfront troublemaker.

"It is most gratifying to note," the report says, "that at the insistence of the Waterfront Employers Association of the Pacific Coast performance of the recently executed agreement with longshoremen has been underwritten by John L. Lewis, president of the United Mine Workers of America, and Philip Murray, president of the C.I.O."

In the past it has not been difficult to get the waterfront unions to make contracts but performance has been ephemeral. Pressure on the part of employers to bring about Harry Bridges' deportation will undoubtedly slacken, if national CIO leaders can keep him in line. There is no desire on the part of Coast employers to exchange a shackled Bridges for an untamed successor.

TOUCHINESS on the part of industrial labor is apparent in southern California where industrial adolescence combines with a traditional open shop policy.

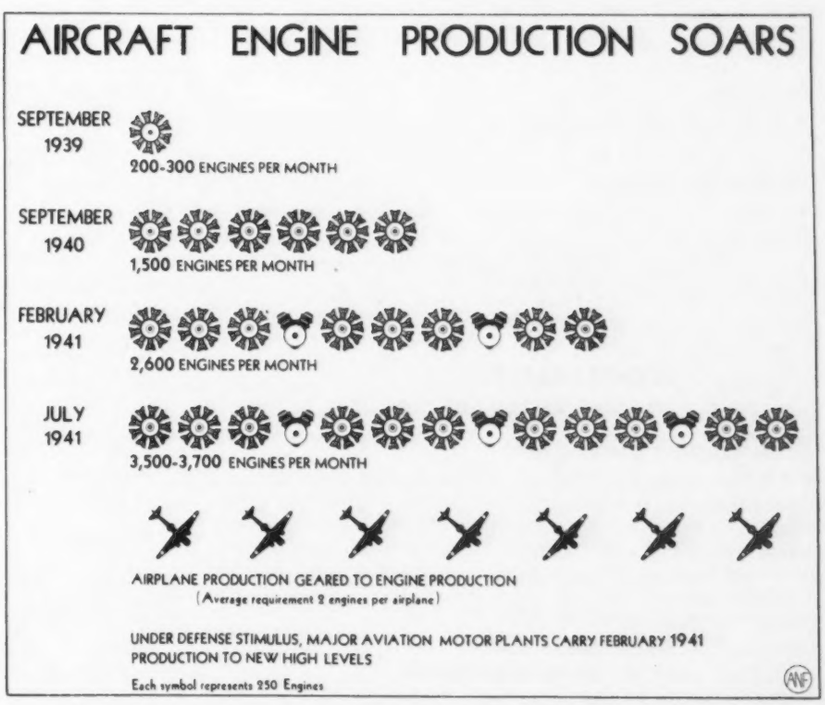
CIO and AFL are fighting over the juicy aircraft industry, but no major strike seems imminent. Much sniping is in evidence. Some 420 CIO employes of Harvill Aircraft Diecasting Corp., engaged in making small parts for southern California aircraft factories, went on strike last Friday in support of demands for improved wages and working conditions. Bethlehem's Los Angeles fabricating division was the target for CIO pickets, affecting about 120 workers. Labor board elections are underway in many plants, and 8000 North American Aviation employes voted March 13.

Reynolds Metal Co. has chosen Longview, Wash., as the site of its West Coast plant, where it will produce 30,000 tons of aluminum annually. Contract has been signed for 60,000 kilowatts of Bonneville-Grand Coulee power.

The Nevada Massachusetts Co. has made arrangements with the OPM to enlarge its tungsten plant at Mill City, Nev., at a cost of $400,000. The enlargement will enable the company to increase its present milling capacity of 250 tons of scheelite daily to 400 tons. The firm recently completed and placed in operation a tailings retreatment plant with a daily capacity of 1000 tons.

A $20,000,000 expenditure for new locomotives and freight cars was announced last week by Southern Pacific Co. This outlay is in addition to the purchase of 40 diesel-electric switching engines, at a cost of $2,900,000 since the first of the year.

ANNOUNCEMENT of suggested scrap price differentials from Pittsburgh prices will bring much relief to Coast mills, which are almost completely dependent on scrap for their operations. The edging up of Coast prices from their former position of several dollars below Pittsburgh to a level equal or higher than Pittsburgh has drawn sharp howls from the mills. Scrap dealers, much of whose business was with Japan at slightly higher than domestic prices prior to the embargo, claim that this preferred rate should now apply to all scrap, and that increased mill demands may produce a scarcity or at least increase assembly costs. The mills counter with the claim that the expulsion of the Japanese from the market has made available about 550,000 tons more annually for domestic consumption, and that even with increased operating rates the readily available supply will exceed demand by about 200,000 tons.


AIRCRAFT ENGINE PRODUCTION SOARS
SEPTEMBER 1939
200-300 ENGINES PER MONTH
SEPTEMBER 1940
1,500 ENGINES PER MONTH
FEBRUARY 1941
2,600 ENGINES PER MONTH
JULY 1941
3,500-3,700 ENGINES PER MONTH
AIRPLANE PRODUCTION GEARED TO ENGINE PRODUCTION
(Average requirement 2 engines per airplane)
UNDER DEFENSE STIMULUS, MAJOR AVIATION MOTOR PLANTS CARRY FEBRUARY 1941 PRODUCTION TO NEW HIGH LEVELS
Each symbol represents 250 Engines

AIRCRAFT ENGINE production reached a new high of 2600 in February, according to an Aeronautical Chamber of Commerce survey. By midsummer 1941, the Pratt & Whitney, Wright and Allison plants are expected to be turning out from 3500 to 3750 engines monthly.

Fatigue Cracks

BY A.H.DIX

Greek Root Foils Pedants

• • • Your Detroit hired man, Bill ("On the Assembly Line," see page 74) Sherman, says the OPM is hot and bothered about the meaning of the word *stereopodicism*. The Bureau of Standards has flunked it and so have the motor city's Greek scholars. The best they can make of it is "hard-footed."

What the excitement is about, we don't know, but maybe a requisition has come through calling for a batch of field artillery pieces, stereopodically equipped, which may be the hard way of specifying solid-tired wheels.

This etymological eutectoid may be gumming up the whole defense program, so if you know the answer please rush it by air mail.

Aptronyms

• • • We are sorry to report that Brig. Gen. W. P. Boatwright isn't with the Philadelphia Navy Yard after all. He heads the Frankford Arsenal, as both Graham (Baldwin-Southwark) Rohrer and Laird U. (Park & Williams, Inc.) Park inform us.

This is one of life's bitter tricks, like making Joseph Flask of Warren, Ohio, a welding foreman, instead of placing him where he belongs, in the foundry. However, it is consoling to know that the Brooklyn Navy Yard has a Commander Portz. (*Thank you, Graham.*)

It is a pleasure to report, too, that F. Lock is a member of the Yale & Towne organization, and S. B. Lewis of the Sykes Advertising Agency, Pittsburgh, sends us a clipping from the March *Industrial Marketing* showing the president of the Minneapolis-Honeywell Regulator Co. looking over a sales campaign on automatic heating. The president is H. W. Sweatt.

Stopper

• • • *More open than ever—Placard in a bombed London store window.*

Hydraulic Water

• • • We have John Howe Hall to thank for sending us this gem from a contemporary publication:

"... and remove the scale by a scalebreaker, by cross-rolling, or by a spray of hydraulic water."

And F. K. Van Almelo notes the marriage of high finance and mass production in this headline clipped from a technical journal:

STOCK WATERED AUTOMATICALLY

Beak-dipping Descendant

• • • The abuse of the word *bar*, as applied to dispensing establishments, is reaching new heights. *Oyster bars* and *milk bars* were bad enough, but now the word has been taken over by the department stores, resulting in a rash of *corset bars, pajama bars, shoe bars* and *brassiere bars.*

Which reminds us that a Duquesne, Pa., newspaper recently ran this arresting head:

WHILE MILLS BOOM, BARS HAVE SLUMP

The news item explained that beer and liquor sales have dropped because steel mill people are too busy to keep up with their quota of glassware elevating, proving, as someone said, that one man's Mede is another man's Persian.

Provisional Squawk

• • • *Time* claims it is the "fastest printed magazine." Maybe it means the fastest printed *general* magazine. Your favorite family journal is a magazine. Its last form does not close until late Tuesday; the press room runs all night; copies are in the mails Wednesday morning, and are delivered to most subscribers east of the Mississippi by Thursday.

If *Time* beats this schedule we are sorry we brought up the matter.

Tigah Umpot

Our reticent friend, Pontiac's press agent, informs us confidentially in a mimeographed press release that W. J. Mougey, Pontiac's ad chief, ended a speech the other day with this, "And now I will leave you with this ancient Malayan proverb, '*Satee duah tigah umpot. Limah annum tujah. Delapan sembibilan sapulo.*'"

This does not mean "*White man devil wagon models maybe no change much in 1942.*" Old "W. J.," as we Pontiac boys call him, was simply counting up to ten in Malayan. The language is musical and has possibilities. You could, for instance, telephone a Malayan highbrown by telling your operator, "*Get me Singapore three sembibilas and a tigah, party J, and if a man answers hang up.*"

Anti-Automotive Note

• • • *We thought that this time we were going to have a motorized army, but we see from last week's list of government awards that the Blackhawk Mfg. Co., Milwaukee, has been given an order for $264,225 worth of jack assys.*

Invitation

• • • If you will be at the American Society of Tool Engineers' Machine & Tool Progress Exhibition, beginning Monday in Detroit's Convention Hall, rest your tarsi and metatarsi in our Booth No. 105—soft chairs, telephone, handsome stenographer, and so on.

Three Smart Girls

I like a joke as well as anyone, but in your Feb. 13 "Fatigue Cracks" you list (as the result of a reader preference survey):

The Iron Age	57
Second Publication	24
Third Publication	22

That makes 103 per cent. How come? Most people are content with 100 per cent.

—*C. G. Stewart, La Grange, Ill.*

We would not only be content with 100 per cent; we'd be delirious. But nothing was said about per cent in the original item. The item read "57 votes," which was more than double the showing made by our nearest contemporary.

Mr. Stewart also informs us that, unlike the Detroit reader who says his two sons, aged 14 and 16, crave THE IRON AGE and read it every week from c. to c., his three daughters, aged 9, 12 and 17, will have nothing to do with it. This suits us fine, as we have a working agreement with the *Girl's Companion, Mademoiselle, Junior League Magazine* and the *Woman's Home Companion* to stay out of their background if they will stay out of ours.

Puzzles

Last week's potato racer covered 1800 yards.

Don F. (Vulcan Crucible Steel Co.) Morse gives 15.98 ft. as the answer to the ladder-and-alley problem, and his crystal-clear method solution is being sent to Frank G. Norris, who asked for it. And thanks to A. W. (Youngstown Steel Tank Co.) Kelly for finding six right answers to the Jan. 23 calf-lamb-pig problem. He found you could sell pork for from 32c. to $4.34 and still come out all right.

The right answer to this in 20 minutes will get you a gold star on your report card and a headache:

When I was born, my sister was one-fourth as old as my mother. She is now one-third as old as my father, and my own age is one-fourth of my mother's. In four years I shall be one-fourth as old as my father. How old am I, my parents and my sister?

News of Industry

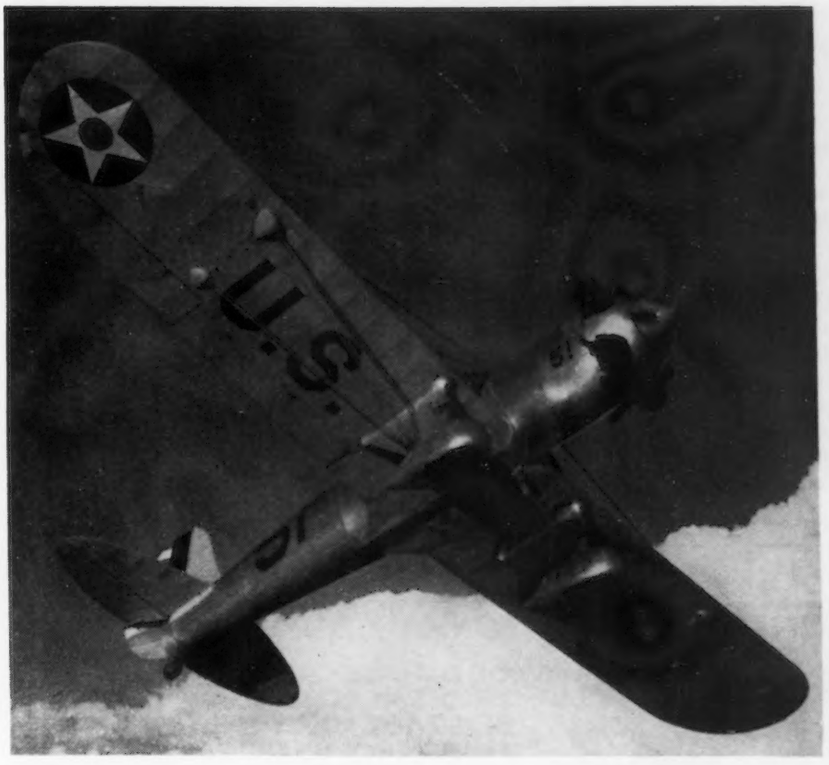


Photo by Harris & Ewing

NEWEST TRAINER: Among the latest training planes of the U. S. Army Air Corps are sleek, low-wing PT-20 monoplanes (above).

SWOC "Persuades" Gary Workmen To Pay Dues

Gary, Ind.

• • • **Unique definition** of the word "force" was applied by the SWOC sub-district director here, defending the union's new method of picketing, supposedly used for the first time at steel plants in this area. The picketing which started several weeks ago at the plants of Inland Steel Co., Youngstown Sheet & Tube Co., and Carnegie-Illinois Corp., employed the method of stopping all workmen at mill gates and admitting to work only those who held union cards and had fully paid-up dues.

When the Lake County Civil Liberties Committee here said it sympathized with the union's activities but did not agree that force should be used in keeping men from work, the union director told the committee that pickets were not using force, "We simply 'persuade' them not to go through the gates to work," he said. The union leader, when told that use of force was illegal, countered with the statement that pickets merely suggested to non-union men and members who had been lax dues payers that it would be "best" for them not to enter, and that most of "them didn't want to go through after we talked to them."

When the committee asked if those who insisted they did not want to join a union were permitted to go through, the union's spokesman replied: "We did not invite them to go ahead into the plants. We advised them not to and they took our advice. Most of them went right down to the union hall and joined."

Mild criticism has been leveled at the city's administration for failure to enforce men's right to work if they choose. Mayor E. L. Schaible, who also attended the meeting, said that "it was not true that we threatened to arrest anyone who went through the picket lines. What we said was that anyone who used violence to get through a picket line would be arrested, but we also said we would arrest any picket who committed any act of violence."

Picketing "not against the companies" but "against workmen" continued to go ahead with pronounced success, according to union leaders. Frank Grider, district director, announced that the Gary works of Carnegie-Illinois would be subjected to the drive "sometime during the week of March 23."

Warner & Swasey Men Eat On Job, Aid Defense

Cleveland

• • • **The national defense program has been benefiting here from the elimination of lunch time by workers in the machine tool industry. Employees of National Acme Co. several months ago started the practice of working straight through the shift. Workers at the plant of Warner & Swasey Co. eat on the job. This enables them to be handy to their machines, which continue operating.**

Arsenal To Build Forge, Heat Treating Plant

Rock Island, Ill.

• • • **The arsenal here** is reported to have asked for bids on a $175,000 forge and heat treating plant and on the work for clearing the site for a $2,640,000 military warehouse. The commanding officer stated that the work was expected to begin soon.

Millions Must Be Hired, OPM Declares

Washington

• • • **The Office of Production** Management, in a leaflet signed jointly by Director General William S. Knudsen and Associate Director General Sidney Hillman, advises defense employers how to use the employment and training facilities of the federal and state governments, including the services of the United States Employment Service, the training-within-industry section of the defense commission's labor division, the Office of Education, and the Federal Committee on Apprenticeship.

"Several million additional people must be hired by your mines, factories, and shipyards to carry out the defense program as scheduled through Dec. 31, 1941," the OPM heads write in the booklet. "To assure a steady flow of qualified men and women to operate the machines which will turn out the guns, tanks, planes, and ships called for by Congress and the President, the Labor Division of the National Defense Advisory Commission has set up and coordinated a vast training program, both in the Nation's schools and 'on-the-job.'

"The services of your government's agencies and the Training-Within-Industry Section of the Labor Division are at your disposal. They are free. Use them. Use them liberally and intelligently and you will have the manpower to keep the wheels turning in our country's drive to make America the 'arsenal of democracy'."

HERE'S WHAT $7,000,000,000 MEANS
$7,000,000,000. IN $10. BILLS LAID END ON END WOULD BE 67,662 MILES LONG OR 2½ TIMES AROUND THE EQUATOR!
—OR YOU COULD PAY FOR
120 EMPIRE STATE BUILDINGS at $50,000,000. EACH
115 TRIBOROUGH BRIDGES at $60,000,000. EACH
120 DREADNAUGHTS at $50,000,000. EACH
2,350 SUBMARINES at $3,256,000. EACH
28,000 4-MOTOR BOMBERS at $250,000. EACH
2,090,000 TANKS at $3,350. EACH
ALL EDUCATIONAL COSTS in the U.S. for 3 YEARS at $2,225,000,000. PER YEAR
A $50. BOND for EVERY LIVING MAN WOMAN and CHILD in the U.S.
LH

International News Photo

WHAT 7 BILLIONS would do: What war costs mean is shown in the above self-explanatory chart of equivalents drawn after President Roosevelt signed the historic Lease-Lend Bill.

Vises In Odd Sizes Dropped Through OPM

Washington

• • • **Manufacturers** of machinists' vises last week agreed with OPM production officials to eliminate certain odd sizes in the interest of speeding defense production through greater simplification. Some manufacturers were represented as estimating that this voluntary action would increase production by 25 per cent.

Each individual manufacturer is expected to announce in detail the types and specifications of vises affected by adoption of the standards. Announced by H. H. Kuhn and H. F. Seymour, of the mill equipment and supplies unit, Tools Section, Office of Production Management, the development followed an industry conference and a survey of the industry's defense production facilities.

McKenna Finds Tool Steel Demand Can Be Met

Pittsburgh

• • • **The tool steel** industry can supply the demand upon it provided customers limit their purchases to immediate needs and avoid advance buying in anticipation of either a shortage or an increase in price, Roy C. McKenna, president, Vanadium-Alloys Steel Co., Latrobe, Pa., told stockholders last week. He added that with reasonable cooperation from customers the company can take care of their needs. The company reports net earnings for the six months ending Dec. 31, 1940, of $608,609, equivalent to $3.04 a share.

Crane Builders Get Preferred Ratings

Washington

• • • **Nine builders of electric** travelling cranes have been granted a general preference order by OPM's Priorities Division, assuring them of prompt delivery of motors, switches, and controllers, as well as steel bar, plate, shapes, forgings and castings.

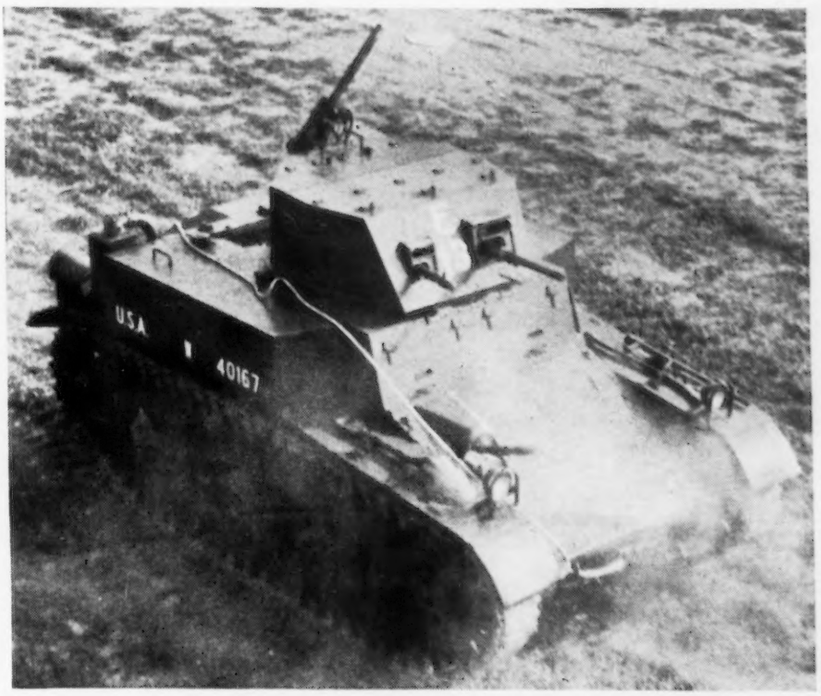
The first of a new form of limited blanket ratings, the order gives preferential treatment on specific material but requires the recipients to agree in writing to its terms before becoming effective, as to individual manufacturers. Director of Priorities Edward R. Stettinius, Jr., explained that orders of this type will be rigidly restricted and granted only in special cases where completion of contracts on delivery dates is impossible by other means.

In agreeing to the terms of the order, a company may exercise a preference rating of A-1-c, which may be extended to sub-contractors, on the items listed, by means of photostatic copies. The ratings, issued on March 12, will expire June 30.

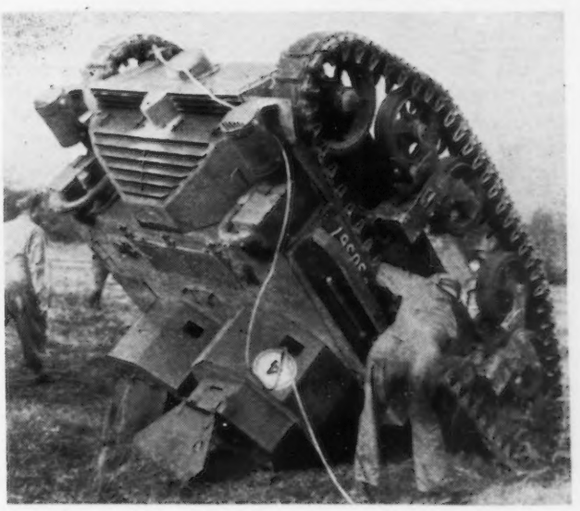
Dexter S. Kimball, chairman of the OPM tools and equipment group, informed the nine manufacturers that they are required under the terms of the agreement to: (1) supply the priorities division with a schedule of deliveries for the succeeding month; (2) make deliveries of products or parts as directed by the OPM priorities division when any such directions are given; (3) maintain records of all extension of preference ratings under the order, including the name of the contractor, kinds and quantities of material, and delivery dates covered by such preference extensions; and (4) furnish the division with information on extensions and material carried in stock, and submit to an audit and inspection by government representatives with respect to such matters.

The electrical equipment covered by the general preference order includes motors, switches, controllers and connections. Finished or semi-finished fabricated parts and accessories specifically include bar, plate, shapes, forgings, and castings of steel.

The rating does not extend to other material and is to be applied only as to such orders which enter directly into products for delivery under Army, Navy or British defense contracts.



Photos by Harris & Ewing



UPSIDE DOWN TANK: This tank, right, which violated some army regulation, is shown at Ft. Belvoir, Va., after it struck a log and turned over. Above is a cavalry combat car.

Coming Events

March 17 to 22—Oil Burner Institute meeting, Philadelphia.

March 25 to 29—American Society of Tool Engineers, Machine and Tool Progress Exhibit, Detroit.

April 16 to 18—Electrochemical Society, Inc., spring meeting, Cleveland.

April 23 to 25—Concrete Reinforcing Steel Institute, annual meeting, Hot Springs, Va.

April 23 to 25—Open Hearth and Blast Furnace Committees, American Institute of Mining and Metallurgical Engineers, annual meeting, Chicago.

May 8 to 9—National Metal Trades Association, annual convention, Chicago.

May 12 to 15—American Foundrymen's Association, annual meeting, New York.

G-M Subsidiary Adds 2 Cupolas, Electric Furnace

Saginaw, Mich.

• • • **Modernization and** expansion of the Malleable Iron Division of General Motors Corp., Saginaw, has been announced by officials. Two new cupolas and an electric furnace will be installed to increase the plant's daily capacity from 1000 tons to 1400 tons. The plant will be rezoned and the manufacturing set-up revised, accompanied by shifting of conveyor systems, to provide freight line production methods that will increase plant efficiency. Eventually 200 more men will be employed.

More Plant Expansions Reported At Dayton

Dayton, Ohio

• • • **Industrial expansions** continue to be numerous here, climaxed recently by the announcement of National Cash Register Co. that a new $500,000 building will be erected to house punch press operations. Air Reduction Sales Co. has purchased a foundry building which will be remodeled at a cost of approximately $150,000. Ohio Heat Treating Co. has purchased a tract of land on Beckel Street to be used for future expansion.

WPA Erects or Improves 3900 Buildings For Army, Navy

Washington

• • • **The WPA is engaged** in construction or improvement of more than 3900 buildings for the War and Navy Departments and other military and naval agencies, according to Howard O. Hunter, Acting Commissioner of Work Projects.

Spicer Mfg. Expands

Toledo, Ohio

• • • **Spicer Mfg. Co.** will build a $350,000 addition to its plant here to house general offices and create additional manufacturing space. The three-story office structure will be 100 by 400 ft. Offices formerly were housed in a section of the factory and vacating that portion will add 45,000 sq. ft. of manufacturing space.

Heavy duty transmissions and propeller shafts for tanks and trucks for defense purposes have constituted a large volume of recent business. It is estimated now that the sales volume for the fiscal year ending Aug. 31 will surpass last year by 50 per cent.

Gisholt Uses Color Film For Training

Madison, Wis.

• • • **Gisholt Machine Co. will produce a sound and color motion picture for use in training turret lathe operators for the defense program. The film probably will be distributed to firms interested in giving their men added visual training.**

NEW FOUNDRY addition is being erected at G-M's Pontiac Motor Division under supervision of Omer Allen (below) foundry superintendent. New equipment will include welding furnaces, a battery of swing grinders, nine new mills for small parts, plus three new core ovens.

Northern Pump Co. to Enlarge $5 Million Plant

Minneapolis

• • • **Further enlargements** of its new $5,000,000 plant will be made by Northern Pump Co. here. It is said that an 800 ft. material storage building, a third floor to be added to the two-story administration building, tripling of the foundry's size, and erection of two more 1000 ft. plant buildings are to be included in the expansion program. The firm holds defense contracts amounting to more than $50,000,000.

Earnings Increase For Metal-Working Plants

Chicago

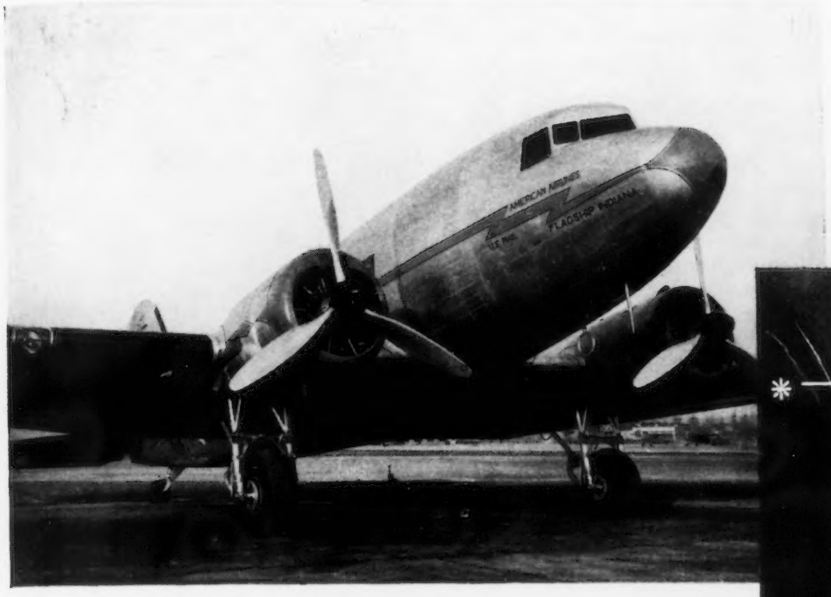
• • • **Earnings of leading** metal-working plants in this section show that South Bend Lathe Works, South Bend, Ind., reported profit of $634,305 in 1940 compared to $386,870 in 1939. Chicago Pneumatic Tool Co., located here, and domestic subsidiaries showed net income of $1,717,602 for last year. Link-Belt Co. income of $2,514,381 was ahead of the 1939 return of $1,733,059. Stewart-Warner Corp. earned net income of $1,470,804 in 1940 compared to the 1939 figure of $533,224.

G-E Employees Earnings Average $2,011 in 1940

• • • **Average annual** earnings per General Electric Co. employee amounted to $2,011 for 1940, compared with $1,913 for 1939, and were the highest in the history of the company, Charles E. Wilson, president, reports.

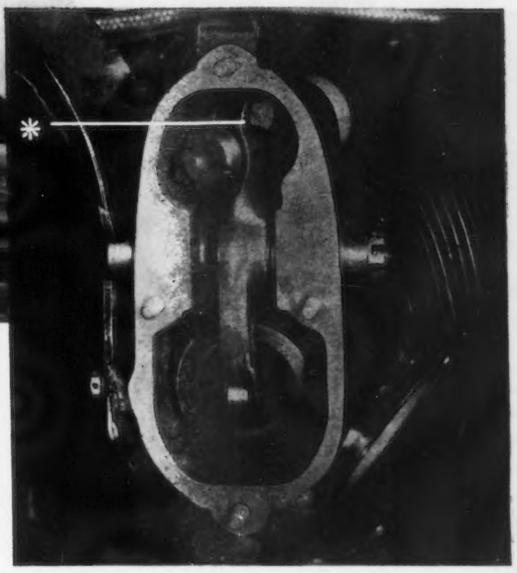
United Earnings $3,724,460

• • • **United Engineering** & Foundry Co. reports that 1940 was the second best year in its 40-year history in volume of sales, net earnings and dividends paid, number of employees and wages and salaries paid. The 1940 results, as reported by George T. Ladd, president, show net earnings amounted to $3,724,460 equivalent, after preferred dividends, to $4.47 per share of common stock outstanding, as compared with net earnings of $2,149,328 in 1939, equal to $2.55 per common share.



Everlock

U. S. PAT NO. 1775705



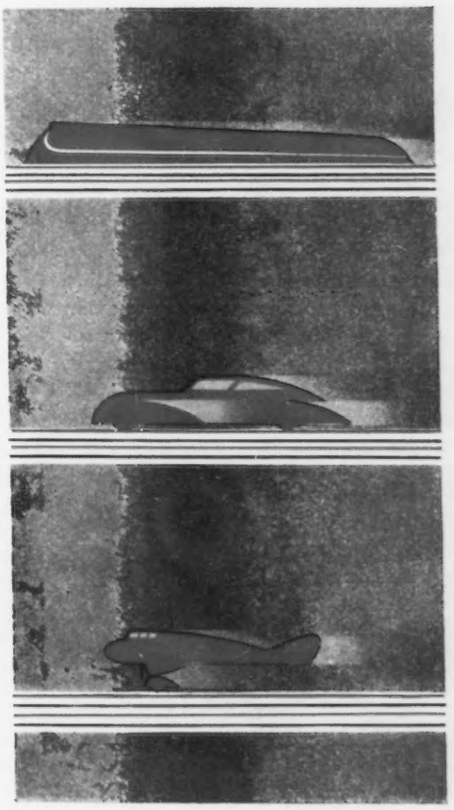
* THIS IS THE ROCKER ARM ASSEMBLY

American Airlines Specify

EVERLOCK WASHERS

THE rocker arm assemblies of all American Airlines Flagships are equipped with EVERLOCK WASHERS. The rocker arm assembly operates about 1,000 times a minute and must hold the set screw tightly in place for approximately 85,000 miles before readjustment. Positive action of the rocker arm assembly at the point pictured in the above photograph is assured by the use of EVERLOCK WASHERS beneath the cap screw head. EVERLOCK WASHERS stop loosening of bolts, screws and nuts.

Look to EVERLOCK WASHERS for the solution of your lock washer problems. Listen to the enthusiastic praises of the users of EVERLOCK WASHERS and profit by their experience. There is an EVERLOCK WASHER of the correct size and type for every purpose.

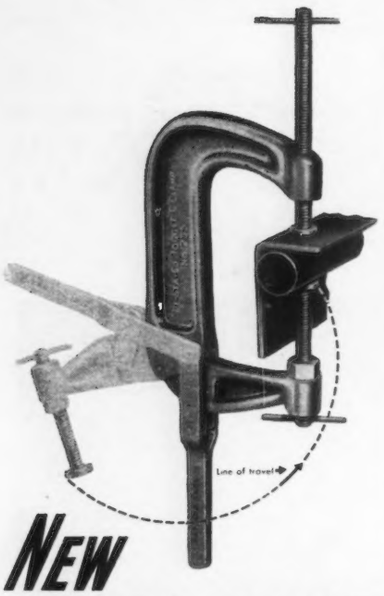


Immediate Deliveries

THOMPSON-BREMER & CO.

1640 WEST HUBBARD ST. • CHICAGO, ILLINOIS

OTHER WASHERS HAVE BEEN TRIED—NOW EVERLOCKS ARE SPECIFIED



NEW "C" CLAMP
With Quick Acting
TOGGLE MOVEMENT

Combines all advantages of the old style "C" clamp plus swift toggle action. When released, entire lower half of clamp swings clear of the work.

Two adjustable rods permit holding work at exactly the desired spot. Will hold many types of work not possible with ordinary "C" clamps.

Made now in 6" size only; clamp of malleable iron, toggle links of case-hardened steel. Withstands clamping pressure of over one thousand pounds.

TWO MODELS—No. 255 as illustrated has screw type, threaded rods; No. 256 is exactly the same except holding rods are ½" standard, smooth rods, for use in arc welding where sparks might otherwise damage the threads on the screw type rods.

PRICE—$5.00 per clamp, f.o.b. Detroit. Unless otherwise requested Clamp No. 255 (threaded holding rods) will be shipped. Write for price on lots of twelve or more clamps.

Mail Your Order Direct To:—

DETROIT STAMPING CO.
345 Midland Ave. DETROIT, MICH.

NLRB Dissolves Precision Castings Co. Plant Union

Washington

• • • **The National Labor** Relations Board has directed the Precision Castings Co., Inc., of Syracuse, N. Y., to disestablish Precision Employees Association as a collective bargaining agent for its employees at the company's Cleveland plant; and to invalidate the sole bargaining contract between the Association and the company.

The NLRB at the same time dismissed allegations of the complaint that the company had discriminated against employees by hiring strikebreakers or guards and cooks for strikebreakers to interfere with self-organization of the employees.

LeBlond Publishes Book: "America Sings"

• • • **A broad social interpretation** of the American way of life and the relation of the machine tool industry to the national defense program is combined with details of construction and catalog data on LeBlond lathes in a 72-page book, "America Sings," issued by the LeBlond Machine Tool Co., Cincinnati. The theme is set from the poem, "I hear America Singing," by Walt Whitman and is beautifully illustrated in a series of nine 17 x 11 in. airbrush murals in three colors, which are scattered throughout the book. The murals present by means of words and pictures the challenge facing industrial America.

Production Planning Course Offered By Iowa University

• • • **The University of Iowa** is offering for the third summer a special 3-week course for people in industry interested in comprehensive training in production planning—routing and scheduling of work, motion and time study, layout of manufacturing equipment waste elimination, and related subjects. Executives and engineers from 30 different industries in the United States and Canada attended the course last summer. The course will be under the direction of Ralph M. Barnes.

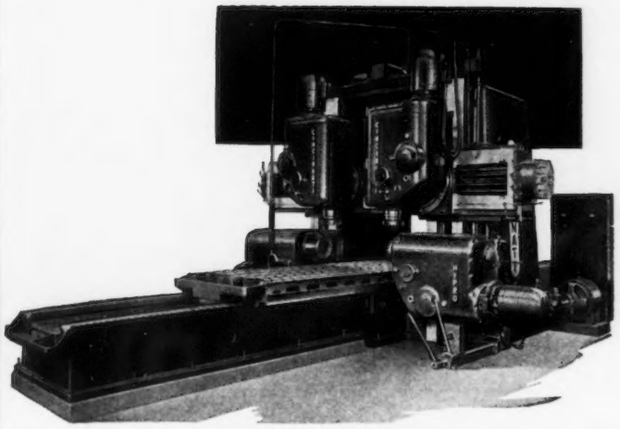
FIRST AIRPLANE parts to be shipped by Hudson Motor Co. under private contracts placed recently by aircraft companies were riveted aluminum alloy ailerons (above).

Timken Mails Samples Of Die Steel Work

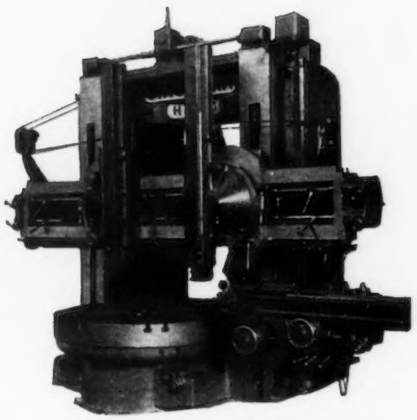
• • • **To illustrate** performance of forming dies made of its Graph-Mo graphitic die steel, the Timken Roller Bearing Co., Canton, Ohio, is mailing to prospective customers a sample roller bearing cage blank stamped and formed by a graphitic steel die. The samples mailed are in the range of the 175,000th to the 200,000th piece off the die, but since the same punch and die had already produced 500,000 pieces on previous runs, without regrinding, it is expected that the performance life of these Graph-Mo dies will be around 3,000,000 pieces. The material is a 1010 hot rolled carbon steel coil stock of 0.070 gage, and the rust resisting oil coating was the only lubricant used. An ordinary tool steel die used prior to this one produced a maximum of 50,000 pieces per grind and required special lubricant for drawing.

"PROFITS IN THE MAKING" *with* FOR 1941 CINCINNATI TOOLS

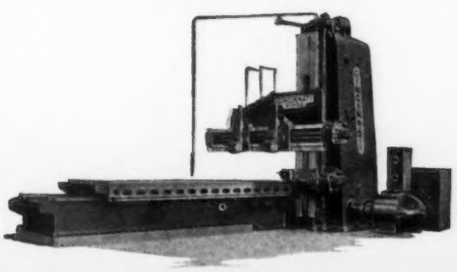
HYPRO PLANERS



HYPRO MILLERS



BORING MILLS



OPENSIDE PLANERS

DESIGNED for the most exacting service and built to "take it" under high production, continuous operation—Cincinnati Hypro Planers, Millers and Vertical Boring Mills can be depended on to deliver the goods—and cut both time and costs.

Sturdiness, adaptability and operating flexibility are combined in these machines to produce fast, accurate work. "Profits in the making" are assured in every shop that puts these modern machines to work.

HYPRO PLANERS

These machine tools are outstanding in their high productive capacity and are designed for the utmost rigidity in supporting both tool and work. With a range of table speeds from 8' to 240' per minute on cut and return strokes they are adapted to a wide range of work and assure maximum speed on any specific job. Smooth flowing power is assured by herringbone table drive. Side thrust pressures are eliminated.

HYPRO MILLERS

The new Cincinnati Hypro Planer Type Millers are designed with massive pyramid shape housings and with a table drive that delivers smooth flowing, efficiently transmitted power which is free from side thrust pressures. Milling heads are completely self-contained and Timkenized. Many other outstanding features are offered which command attention. Investigate NOW!

BORING MILLS

These modern units provide spiral bevel gear table, a completely Timkenized speed box as well as rail head saddles that are mounted in antifriction roller bearings. Many other details of design and construction have been developed in these machines to assure high production, low operating cost, convenience and fast economical work. Explore their possibilities on your difficult jobs.

OPENSIDE PLANERS

These Cincinnati units are built in both openside and double housing types. Simple, convenient and trouble-free magnetic feeds are provided for all heads. Feeds are available in increments of 64ths from 1/64" to 1". Ask our engineers how you can eliminate bottle necks in your production and save money with these modern machines.

A Complete Line

CINCINNATI HYPRO MILLERS—Sizes up to 120".
CINCINNATI VERTICAL BORING MILLS—4', 5', 6', 7', 8', 10' and 12', also 10-16' Extension Mill.
CINCINNATI OPENSIDE PLANERS—30" to 120".
CINCINNATI DOUBLE HOUSING PLANERS—24" to 120".

Complete detailed specifications available on request.

THE CINCINNATI PLANER CO.

Cincinnati, Ohio

Germany Gets Ore From Narvik Store

London

• • • **Norwegian experts in** London have received news that three shiploads of Swedish iron ore have recently left for Germany. It was apparently ore which was already stored in Narvik, and there is no indication that the winter export from Sweden, via Narvik, has been resumed.

The ore-loading docks at Narvik were completely destroyed during the military operations last year and it is unlikely that they have yet been rebuilt.

Metal Trades Convention May 8-9

• • • **The National Metal Trades** Association will hold its 43rd annual convention on May 8-9 at the Palmer House, Chicago.

Sleep Losers Told: "Defense Comes First"

Cleveland

• • • **Complaining of losing sleep and "seeing their houses fall apart," neighbors filed a court petition to prevent the Steel Improvement & Forge Co. from operating its forging hammers between 10 p.m. and 8 a.m.**

William H. Staring, of the company, expressed sympathy for the 100 families involved but said, "whereas you are concerned with the health and safety of 100 families, we are concerned with the welfare of our country. We are working completely on defense work."

When counsel for the residents said the company ought to buy two more steam hammers in addition to its 24, thus enabling more production in the day time, Mr. Staring asserted, "You can't find unoccupied hammers anywhere."

2100 Tons of Manganese Ore Produced in January

Washington

• • • **Predicated on reports** received from producers that accounted for 87 per cent of the total in 1939, the Bureau of Mines has announced that domestic production of manganese ore containing 35 per cent or more manganese in January, 1941, was 2100 gross tons. Shipments were reported by Arkansas, Georgia, Montana, Nevada, Tennessee and West Virginia and aggregated 2200 tons, which also was the quantity of producers' stocks at the end of the month.

In December of last year production was 3600 tons. Shipments were 3500 tons and producers' stocks at the end of the month were 2300 tons. The rate of shipments averaged 2442 tons monthly in 1939, when the total amounted to 29,307 tons.

37 YEARS
IN THE WORLD MARKET

UNITED STATES STEEL EXPORT COMPANY

30 CHURCH STREET, NEW YORK, U. S. A.

Cable Address: "STEELMAKER," New York

Defense Plans Aid Marion, O., Industry

Marion, Ohio

• • • **Without the benefit** of many direct awards from the national defense program, employment in ten leading factories here rose from 5114 persons in January to 5306 workers in February, the latter figure being roughly 1400 ahead of the same month one year earlier. It is expected that March will show a further gain.

Subcontracting has been growing in recent weeks. One of the largest plants here has found its facilities in great demand and has been offered work of an emergency nature, brought about by the inability of another Ohio company to meet a deadline on a defense contract which authorities at Cleveland considered vital.

Relief cases declined to around 380 at the start of March, and the number of WPA workers dropped from 619 in January to 507 in February. Sales tax collections are up sharply. Used car sales showed a gain in February while new car sales dropped off.

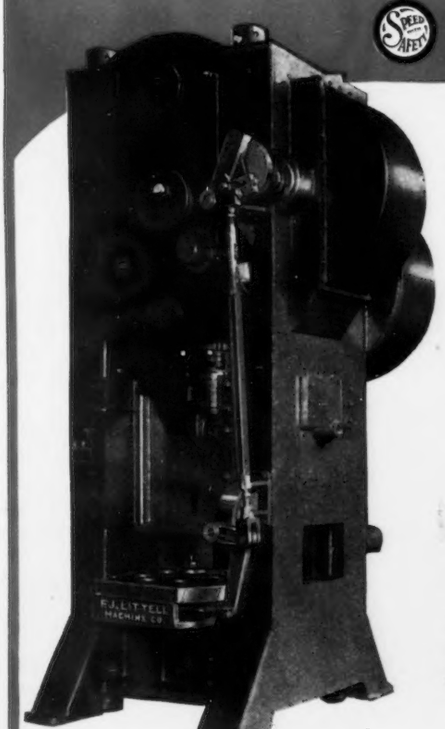
A rough estimate March 7 by the Chamber of Commerce set the amount of defense contracts at around $800,000.

SLOSH TESTER: This device, a slosh tester, stimulates some of the stresses and strains imposed on an airplane's self-sealing fuel tank in flight. Shown here is a B. F. Goodrich Co. engineer examining a 425-gal. tank following a 25-hr. test.

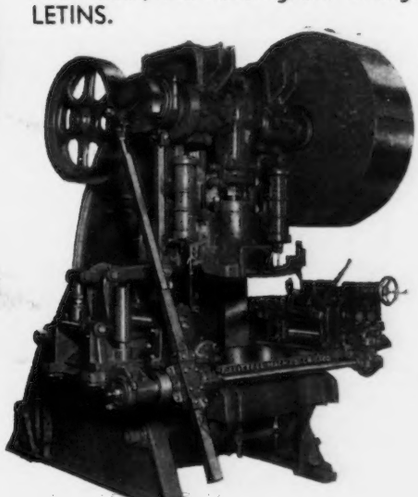
LITTELL for Faster Defense Production

Top speed in National Defense production can be secured with Littell Roll and Dial Feeds, used by leading concerns for increasing output 200 to 300 per cent.

Littell pressroom equipment includes—Reels for coil stock, Roll and Dial Feeds, and Feeding and Straightening Machines. REQUEST BULLETINS.



Littell Dial Feed, mounted on large straight-sided press, for producing cartridge cases. Dial Feeds of this type, used in cartridge case manufacture, perform the following operations: 1st, 2nd and 3rd draw, heading and indenting, piercing and tapering.
REQUEST BULLETIN SEC. 30.



No. 6-12½ Littell Double-Rack and Pinion Roll Feed with Power-Driven Straightener and Scrap Cutter, for blanking and drawing small shells. Mounted on large open-back inclinable press. Feed length, 0 to 15". Feed rolls, 6¼" dia. x 12½" long.
REQUEST BULLETIN NO. 1-A.

No. 3-G Littell Patented Motor-Driven Automatic Centering Reel and Scrap Winder, for unreeling material to automatic presses. Capacity, 300 lbs., 6½" wide.
REQUEST BULLETIN SEC. 5-C.

F. J. LITTELL MACHINE CO.
4151 RAVENSWOOD AVE., CHICAGO, ILL.

. . . WORTH saving . . . in assembly or service adjustments! In machine tool assembly (where *accuracy* is paramount), Laminum shims not only reduce labor . . . they afford a precision which makes older methods a costly luxury. Simply *peel* known gage laminations from the solid brass shim!

Laminum shims cut to specifications. Stock shim materials sold by mill supply dealers.

Laminated Shim Co., Inc.
76 Union St., Glenbrook, Conn

Write for file-folder of shim application photos — with Laminum sample.

LAMINUM
THE SOLID SHIM THAT peels FOR ADJUSTMENT
A-1167

Blast Furnace Capacity Up 2 Million Tons In '40

• • • **Annual blast** furnace capacity of the steel industry was increased nearly two million tons during 1940 by an extensive program of blast furnace modernization and enlargement, according to the American Iron and Steel Institute.

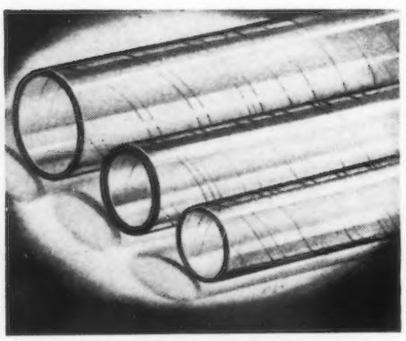
No new blast furnaces were completed during the year, although several were under construction as the year ended and are scheduled for completion this year. As a result of these activities, by the end of the current year, blast furnace capacity will be in the neighborhood of 60,000,000 tons per year.

At the close of 1940, the industry's blast furnaces had capacity for production of 56,522,000 tons of coke pig iron per year, 107,000 tons of charcoal pig iron, and 981,000 tons of ferroalloys. One year before, coke pig iron capacity was 54,636,000 tons, charcoal pig iron was 96,000 tons and ferroalloy capacity was 992,000 tons. Those capacities for producing ferroalloys do not include the ferroalloy capacity of electric furnaces.

Total capacity of the nation's blast furnace at the 1940 year-end was about 5 per cent greater than in 1918, and was very close to the 1929 blast furnace capacity of 57,855,000 tons.

Steelmaking capacity at the present time is almost 40 per cent higher than in 1918, and 15 per cent more than in 1929. Less pig iron is now needed for steelmaking than in those earlier years, however, because of the greater use of scrap steel as a raw material.

Only 25 of the 231 blast furnaces in the country were not in operation on Dec. 31 of last year. Not only was the number of furnaces idle at the year-end the lowest on record, but also the percentage of idle blast furnace capacity was at the record low of 8 per cent of total blast furnace capacity of the industry.



SPIRALLY WOUND acetate tubes—These transparent, non-shrinking tubes are produced (Precision Paper Tube Co., 2033 Charleston Street, Chicago) by applying a special cement to the acetate tape which is wrapped around a steel rod core. They are not easily broken, have a low moisture absorption rate and can be used for low temperature liquid gages.

1940 is "Biggest" Year For Westinghouse Co.

• • • **The Westinghouse** Electric and Manufacturing Co. recorded in 1940 "the greatest expansion in business in its fifty-five years of existence," the company announced in its annual report. New records were made in the volume of incoming orders, amount of sales billed, value of unfilled orders, the total payroll for the year and the number of employees at the end of a year. At the same time, the company's increased tax bill represented $427 for each Westinghouse employee in 1940, based on the average number employed during the year, compared with $238 in 1939.

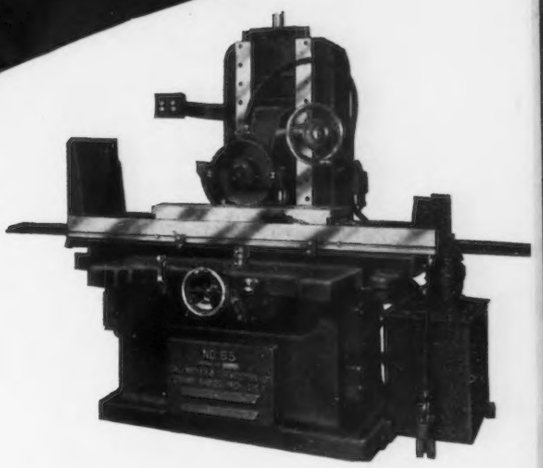
Orders received during 1940 amounted to $400,477,724, an increase of 87 per cent over 1939. Approximately 40 per cent of this 1940 business was orders in connection with the national defense program. Net sales billed amounted to $239,431,447, an increase of 37 per cent over last year. The previous peak was $216,364,588 in 1929.

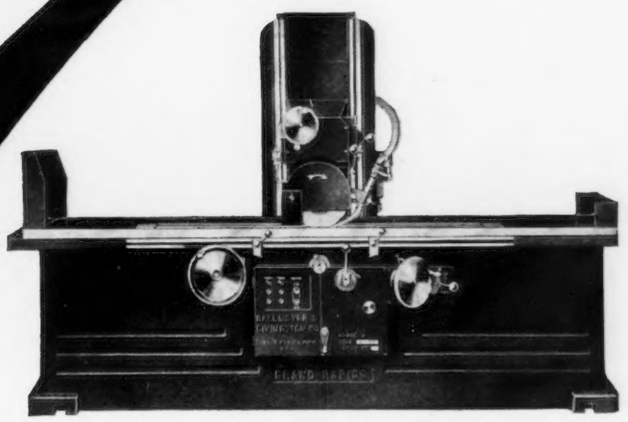
Unfilled orders at December 31, 1940, were $223,685,737, up 216 per cent over 1939. Net income for the year was $18,985,428 compared with $13,854,365 in 1939, an increase of 37 per cent.

At the close of 1940, employees numbered 58,503 compared with 48,487 at the beginning of the year. The average hours worked per employee per week at the close of the year stood at 38.47 as compared with 36.65 hours at the beginning of the year. The total payroll for 1940 amounted to $109,743,043 compared with $80,916,341 in 1939.

GRAND RAPIDS HYDRAULIC FEED SURFACE GRINDERS

TOOL UP FOR A BONUS of EXTRA PRODUCTIVITY!





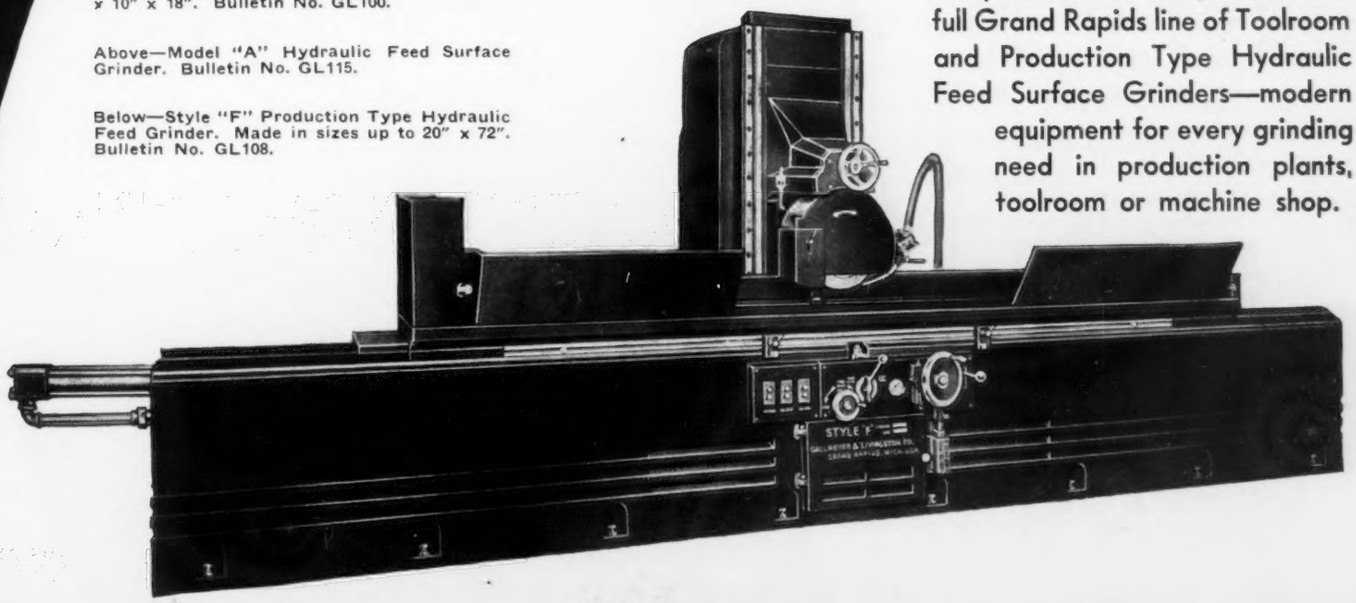
When plans are made for 1941 automotive production, Grand Rapids Surface Grinders will again demonstrate their inherent versatility, their capacity for taking on extra work, their ability to produce to toolroom accuracy at production speeds.

Illustrated here are three of the **newest** Grand Rapids Hydraulic Feed Surface Grinders. Write for complete details and prices of the full Grand Rapids line of Toolroom and Production Type Hydraulic Feed Surface Grinders—modern equipment for every grinding need in production plants, toolroom or machine shop.

Above, right—Redesigned No. 55 Hydraulic Feed Precision Grinder, one of a complete line with capacities from 14" x 17" x 48" to 6" x 10" x 18". Bulletin No. GL100.

Above—Model "A" Hydraulic Feed Surface Grinder. Bulletin No. GL115.

Below—Style "F" Production Type Hydraulic Feed Grinder. Made in sizes up to 20" x 72". Bulletin No. GL108.



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"RACK INSULATION PERFECT!" SAY PLATERS

UNICHROME* RACK COATING-W

"Racks Show No Sign of Breakdown"

NEW YORK, March 20.—Further enthusiastic accounts of the remarkable protection afforded plating racks by United Chromium's "Unichrome" Rack Coating-W confirm early reports from leading platers.

"Unichrome Rack Coating-W still standing up fine after 11 months' use in bright nickel and chromium solutions," — "No sign of breakdown on any of our nickel plating racks," "Finest material ever!"— are typical endorsements.

Advantages of this superior rack-coating material are:

1. Withstands boiling cleaners and all plating solutions.
2. Tough—withstands wear and tear of handling.
3. Contains no ingredients harmful to plating solutions.
4. Cuts costs—reduces frequency of re-coatings.
5. Easy to apply—"dip and force dry" method.
6. Light in color—easy to see how well the rack is covered.
7. Any part of rack can be recoated without recoating entire rack.

Write for Bulletin 15
Containing Complete Information

Platers without rack-coating facilities may have their racks coated with "Unichrome"* Rack-Coating-W by Chromium Corporation of America, 4645 West Chicago Avenue, Chicago, Ill.; Belke Manufacturing Company, 947 North Cicero Avenue, Chicago, Ill.; or United Chromium, Incorporated, Waterbury, Conn.

UNITED CHROMIUM
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51 East 42nd Street, New York, N. Y.
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*Trade Mark Reg. U.S. Pat. Off.

Way Sought to Utilize Scrap From Distant Areas

Philadelphia

• • • **The government** and the Institute of Scrap Iron and Steel, cooperating in a program to provide an adequate supply of iron and steel scrap, are trying to find ways and means to quickly bring 5,000,000 tons from remote areas, so that steel mills and foundries may continue to operate at capacity, to meet defense and normal civilian requirements, in addition to maintaining the present conservative price level of scrap, according to Edwin C. Barringer, executive secretary of the Institute, in an address, March 12, before Philadelphia district dealers.

This 5,000,000 tons, or approximately 1/6 of all purchased scrap consumed, an institute survey shows, is located in areas far removed from large consuming centers and presents a problem in transportation to make it available. Adding present transportation charges to the cost of the secondary material, plus its preparation, produces a delivered price much higher than steel mills are paying for equal grades of material in conformity with defense commission wishes.

Capacity operations of steel mills and foundries in 1941 will require approximately 29,000,000 gross tons of dealer scrap in addition to 25,000,000 tons of so-called home scrap, which is produced within the mills and foundries. Against this requirement, dealers see 24,000,000 tons available from the railroads, industrial plants and collections in territory normally tributary to consumers. Present conservative prices of scrap have induced a greater usage of purchased scrap and complicated the problem.

Consumers are beginning to draw on their scrap inventories, but this is regarded as a seasonal development, Mr. Barringer stated. Weather conditions in the first quarter of the year are adverse to outdoor collections and the operations of scrap yards; they also prevent the movement of scrap on the Great Lakes and inland waterways.

At present, the monthly rate of consumption of scrap, both purchased and home, is in excess of 4,000,000 gross tons—an all-time record.

Minimum Wages Fixed at 50c. for Die Casting Industry

• • • **Minimum wages have** been fixed for the die casting industry at 50c an hour, according to the Department of Labor. This wage, effective April 5, 1941, applies to both time and piece work. Apprentices, if their number is less than 5 per cent of the total of workmen employed and if their employment conforms to the standards of the Federal Committee on Apprenticeship, may be paid at the rate of 40c an hour for a period not to exceed 60 days. (This does not apply to the manufacture of die castings when incorporated in an integrated plant.)

SAVINGS IN BROACH costs up to 60 per cent are being made by the Pontiac division of General Motors by grinding flat broaches across the face rather than between the teeth in the conventional manner. In the setup shown at Pontiac, the broach sections are mounted on a magnetic chuck which is tilted to the desired taper by placing a short section of drill rod under one end. The machine is a Thompson grinder, with vertical spindle using a 6 in. cup-shaped wheel.

Old Illinois Law Blocks Overtime

Chicago

• • • An obscure Illinois law enacted in 1935 may keep manufacturers from working skilled men enough hours to make up for the shortage of labor. The law requires that employees be given at least 24 consecutive hours of rest in each calendar week. Employers who thought skilled labor could be worked unlimited overtime as long as time and one-half was paid for all over 40 hours each week, have been reminded of the obstacle this state law presents. It is felt that the manufacturers' association may seek action to eliminate the legal barriers in view of the labor shortage and demands of the preparedness program.

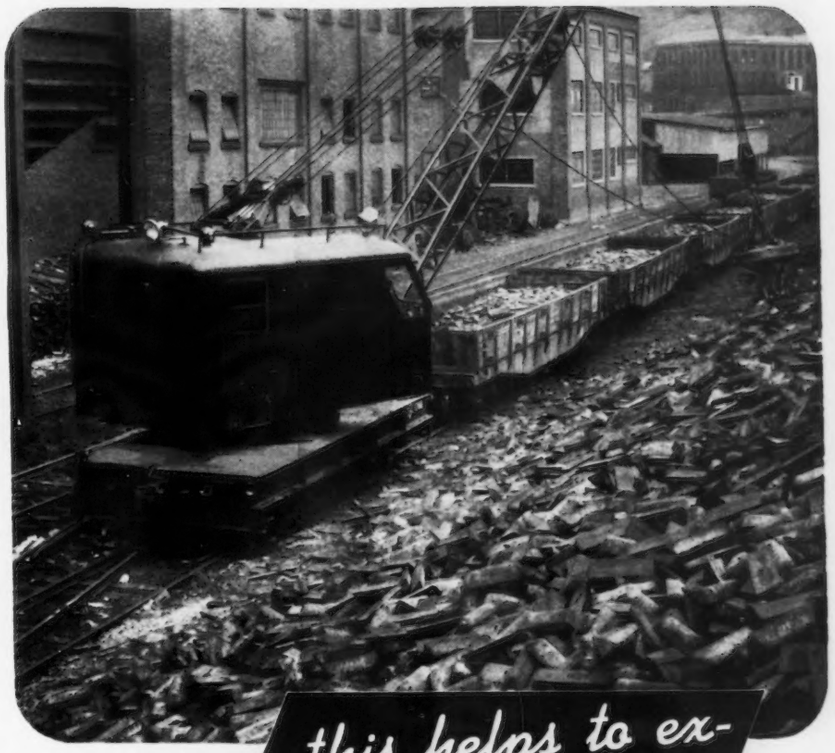
New Factory Opening Rate Lifts Tool Steel Demand

McKeesport, Pa.

• • • **The rate at which new** plants using machine tools go into operation will be the big factor in determining whether high speed steel production is ample to meet all normal and emergency needs, L. Gerald Firth, president, Firth-Sterling Steel Co., said this week. "The pressure of demand for high speed steel should ease off when the nation has passed the crest in the opening of new factories."

"The original tooling requirements of a new plant are, in the usual instance, greatly in excess of its monthly tool consumption. A new machining plant may need as much as 10 tons of tool steel to provide for all layouts and set up for initial operation; thereafter, replacement of consumed tools may be at the rate of less than a ton per month," Mr. Firth stated.

He added: "High speed steel production during 1929 was in the neighborhood of 14,000 tons, whereas the present demand is at an apparent yearly rate of more than 20,000 tons. This increase is all the more significant when we remember that improvements in tools and tooling since 1929 have resulted in a great deal more production per tool. And it must be considered also that a great many machining jobs have been taken over by the sintered carbides."



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American LOCOMOTIVE CRANES

The deck of the AMERICAN Locomotive Crane, the boom — and the load — turn on a true roller bearing. 20 to 27 conical rollers running between machined surfaces fully enclosed and protected. Compare a frictionless bearing like that with the six rollers commonly used. The AMERICAN Roller Bearing Turntable greatly reduces friction and wear; saves power.

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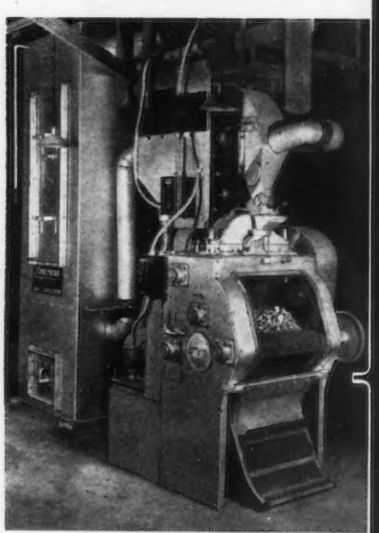
AMERICAN TERRY DERRICK CO. SOUTH KEARNY, N. J.

THE Genuine CROSBY CLIP
FASTENS WIRE ROPE Safely

WHEELABRATING
BRINGS YOU THESE BIG ADVANTAGES IN METAL CLEANING AND FINISHING

BUSY times like these call for fast production. But whirring wheels are no indication of efficiency. A machine can be very business-like about a slow-down. And that is a vicious thing. You can't tolerate it today because tie-ups are fatal to production speed and profit. Metal cleaning and finishing equipment is a frequent offender on this score. Whether it is a problem to be reckoned with in your plant can be determined only by a comparative test. That is why we urge you to investigate WHEELABRATOR airless abrasive blasting, the modern speed-cleaning process used in more than 1200 plants.

Wheelabrating gives you ▶



15" x 20" Wheelabrator Tumblast Installed at Algonac Foundry Co., Algonac, Mich.

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Equipment Available:

TUMBLASTS—made in seven sizes (1 cu. ft. to 30 cu. ft.) for cleaning pieces from a fraction of an ounce up to hundreds of pounds each.

TABLASTS—designed for cleaning flat, fragile, or odd shaped work. Made in standard and special sizes.

SPECIAL CABINETS—designed to clean large, heavy, or unusual jobs that require special handling.

1 **HIGH-SPEED CLEANING** — Reduces costs; speeds up shipment of orders.

2 **CUTS CLEANING COSTS** up to 50% and more — because it is faster; saves power up to 80%; saves labor; saves time in loading and unloading; saves space; saves abrasive; saves on operating and maintenance costs.

3 **REMOVES ALL TRACE OF SAND AND SCALE** down to the virgin metal, with the result that:
- —Machining and grinding are faster.
- —Tools last longer.
- —Inspection is simplified.
- —Hardness readings are accurate.

4 **IMPROVED APPEARANCE** — Wheelabrated products are bright, silvery, and uniformly clean.

5 **PROVIDES PERFECT BOND** for final finishing such as: enameling, plating, galvanizing, painting, etc.

6 **PRODUCES WIDE RANGE OF FINISHES** from fine to coarse.

7 **HANDLES WIDE RANGE OF WORK** — from fine springs to heavy armor plate. Ideal for special and unusual applications.

8 **ELIMINATES CHIPPED AND ROUNDED CORNERS** — only a minimum amount of stock need be allowed for finish machining.

THE AMERICAN MOLDER

AMERICAN FOUNDRY EQUIPMENT CO.

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Existing Tools Must Be Used At Capacity, Engineers Are Told

• • • **Need for getting** more production out of existing machine tools was stressed by many of those participating in the Army and Navy Meeting on National Defense held in Cleveland, March 12 and 13, under auspices of the American Society of Mechanical Engineers and the Army Ordnance Association.

George T. Trundle, Jr., president, Trundle Engineering Co., in his talk indicated that desperately as new machines are needed, if we are to rearm this nation we cannot wait until enough new machinery has been built to re-equip all the defense plants in this country. We must get into production with existing equipment wherever possible.

Mr. Trundle urged the use of old machines for roughing jobs and saving the newest machines for precision finishing operations, just as green help is being put to work on the rougher operations and the skilled jobs reserved for the experienced workers. He said that the No. 1 job of every manufacturer engaged in national defense production is to survey all the equipment in his plant or that of his subcontractors, figure out just what work this machinery can handle, put it in first class working order and start it to work.

Mr. Trundle told of instances where old machines, reconditioned and properly tooled and with the flow of work correctly adjusted, have turned out production at costs only a little higher than would have been the case with new machines. He also cited a case where one-half of a defense contract could have been completed on old machines while the company was sitting around waiting for the delivery of new machines. He concluded with the suggestion that defense contractors tune up old machines to do one job and train a man to do this one particular job.

Theme of the meeting, "Engineers Against Time," was set by Tell Berna, general manager, National Machine Tool Builders As-

Tool up *now* with APEX to keep up Production

Apex Safety Friction Chuck

Apex Stud Setter

Apex Safety Friction Tapping Chucks are tools that will enable you to drive taps to their capacity on through or blind holes without tool breakage. Also recommended for stud and nut setting. Quick change of tools.

Universal Joints: Commercial and Aircraft. Strong and smooth running—cannot over-travel their maximum working angle.

Universal Joint Socket Wrenches: For all types of electric and air nut runners.

FLOATING TOOL HOLDERS: Parallel Float only and also the Universal with both parallel and angular float.

Complete Line of Quick Change Drill Chucks: Positive Drive and Vertical Float Drilling and Tapping Chucks with collets and accessory tools for drilling, tapping, stud and nut setting.

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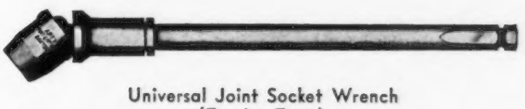
Floating Tool Holder with Quick Change Collet

Universal Joint

Floating Tool Holder with Inserted Sockets



Universal Joint Socket Wrench (Tension Type)

Universal Joint Socket Wrench with Adapter

APEX Power Bits and Drivers

PHILLIPS

SLOTTED HEAD

CLUTCH HEAD

POWER BITS

for Phillips Screws

Sizes: Point Nos. 1, 2, 3 and 4.

Styles: For all makes of electric, air and spiral drivers.

for Slotted Head Screws

Sizes: No. 4 to No. 20.

Styles: For all makes of electric, air and spiral drivers.

for Clutch Head Screws

Sizes: 3/32" to 5/16" Clutch sizes.

Styles: For most makes of electric, air and spiral drivers.

Grades: All Apex Power Bits are made of a special grade of shock-resisting steel, hardened and tempered to give maximum toughness and resistance to wear.

HAND DRIVERS

for Phillips Screws

Sizes: Points Nos. 1, 2, 3 and 4.

Grades: Carbon Steel Blades.

General Purpose—Nickel-Moly steel.
Super—Shock-resisting tool steel for hardened and self-tapping screws.

Handles: Hard Maple, and Superloid—shock-proof and break-proof.

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Sizes: 3/32" to 5/16" Clutch sizes.

Grades: Super only—shock-resisting tool steel blades.

Handles: Hard Maple, and Superloid—shock-proof and break-proof.

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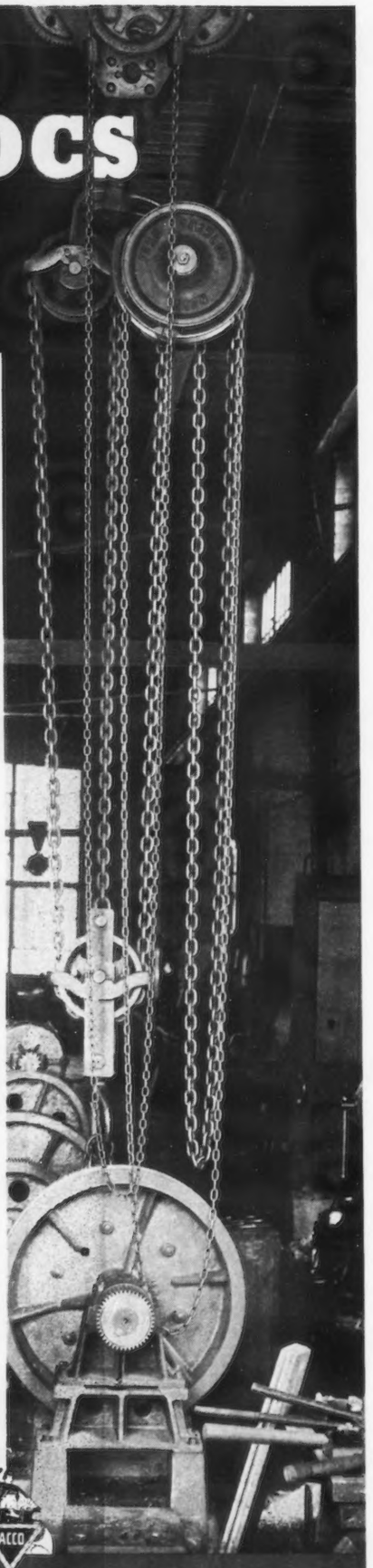

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★ Because the Ford Tribloc is fast, powerful, and easy to handle it gets your lifting jobs done in double-quick time. For these same reasons—plus the fact that it is extremely durable—it saves you many dollars during its long, faithful working life.

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sociation, who indicated that the nation cannot meet an emergency today when it arises. The machine tool industry, for example, must anticipate battles that may be fought 18 months hence. To give some idea of the quantities needed of defense items, Mr. Berna said that to keep one machine gun supplied with bullet cores, assuming it were firing only one-third of the time, would require the output of 24 six-spindle automatic screw machines. And, he reminded his audience, there are as many as eight machine guns in one pursuit plane.

The reason some machine tools are obtainable on three months delivery whereas others cannot be had in 15 months, Mr. Berna said, is because machine tool capacity has been distributed as to type of machine (lathe, boring mill, etc.) in proportion to peacetime needs. Wartime needs finds the industry unbalanced as to capacity and the industry cannot switch overnight. Output, he predicted, would reach $750,000,000 this year, as compared with $450,000,000 in 1940 and $22,000,000 in 1932. Employment has risen from 43,000 hourly wage earners in September, 1939, to 85,000 men now. Approximately one-tenth of present output is subcontracted.

Mr. Berna urged the further use of subcontracting, agreeing with Mr. Trundle that by finding jobs that can be put on older equipment, the load is relieved on new machinery which should be limited to work calling for tolerances in ten thousandths.

The importance of the time element was also stressed by Robert L. Mehornay, Jr., director of Defense Contracts Service, OPM, who said: "Materials produced in time will be of use and strategic value to us, and those which are produced too late may be used by our adversaries." Spreading the work, getting more bidders and more subcontractors can solve the time element of the nation's defense problem, he declared.

Before our present program, our army bought 500 0.50 cal. machine guns per year. Before this year is out, they will be buying 5000 per month, Mr. Mehornay said.

The weight of orders to be spent outside the Navy and aircraft will be four times greater than it has

Aluminum Utensil Makers "Out of Business"

• • • Before addressing the ASME Army and Navy Defense meeting at Cleveland, March 13, Robert L. Mehornay, Jr., director of Defense Contracts Service, OPM, told newsmen that 60 members of the Aluminum Utensil Manufacturers Association had been advised that they would not be able to get any aluminum after they use supplies now on hand, and "were out of business." About 21,000 workers in the aluminum kitchen utensil field will be made idle or forced into defense work. This is the first case of total restriction, Mr. Mehornay said, since the defense program started.

been, Mr. Mehornay said. Ammunition requirements will be stepped up tremendously. Mr. Ford with his 100,000 workers, for example, would have to expand 34 per cent to keep one battery of four 3-in. anti-aircraft guns running the same length of time that those people are working, according to the speaker.

Of the many that took part in the discussion, Francis J. Trecker, of the OPM, revealed that the first $10 billion of defense contracts went to 1300 concerns, and of this amount $9 billion went to 500 or 600 concerns that had the plants, men and managerial brains. There remain thousands of metal working plants not doing defense work. Mr. Trecker indicated that 50 per cent of available machine tools in this country are either idle or partially idle. It is important to get these machines to work quickly.

Other points on subcontracting brought out in the discussion were:

(a) If big firms hand out the headaches (the tough jobs), they must give aspirins with them in the form of more money.

(b) Compensation laws are a bottleneck, preventing many skilled men from working due to inability to pass physical requirements.

(c) Firestone has been working only two weeks on a setup for making Bofors gun but already has lined up 30 subcontractors.

(d) 35 per cent of all defense output is subcontracted now.

(e) For every $1 of direct labor

in prime contractor's plant, subcontracting is costing $1.35.

(f) Small shops are worried about costs and taking risks. It is best for the prime contractor to pay for tooling, assist in getting the job started, than arrive at a price later.

(g) It is often economical to let subcontractors do first operations and bring the work back into the prime contractor's plant for secondary operations.

Photo by Harris & Ewing

INVESTIGATING DEFENSE contracts: The National Defense Investigating Committee, pictured here, with Sen. Harry Truman, center, has started its study of U. S. defense preparations. Dollar-a-year men will be called to testify. Left to right, rear, are Senators Joseph H. Ball, Minnesota; M. C. Walgren, Washington; Tom Connolly, Texas; James Mead, New York, and Ralph O. Brewster, Ohio.

In a session devoted to the problem of gage supply, Elmer J. Bryant, gage division of the Army & Navy Munitions Board, indicated that based on a survey made last fall the capacity of the leading gage manufacturers was being expanded two to three times on key items and these plant additions are going into production now. At the same time a survey was made of all small tool making shops that are capable of doing gage work.

S. B. Terry, chief engineer, gage division, Pratt & Whitney Division, Niles-Bement-Pond Co., who reviewed gaging practice at great length, later cautioned the audience about the difficulties of farming out gage work, saying there were bound to be delays and rejections "unless you keep your eyes open." Discussion brought out that the current shortage of gages is making the temporary use of soft gages made in the contractor's own toolroom necessary, and in some cases deliveries of finished parts are being made ahead of the arrival of gages. It was also pointed out that gages are often too accurate for the limits set and could just as readily be turned out in a milling machine or even with a hacksaw or file. Certain high precision gages, like thread gages, are still "way behind" in delivery because of the limited number of skilled mechanics to make them. Grinding and lapping of thread gages is one of the most difficult production problems.

Both Mr. Terry and Fay Aller, chief engineer, Sheffield Gage Corp., illustrated some of the newer types of fast comparator gages which flash signal lights to indicate whether the work is over or under size or right. With such Multi-Check electric gages, inspection work on shell can be doubled over the use of snap and ring gages. A new unit developed for checking brass cartridge cases allows one man to do the work of 18 by automatically checking nine dimensions at one time.

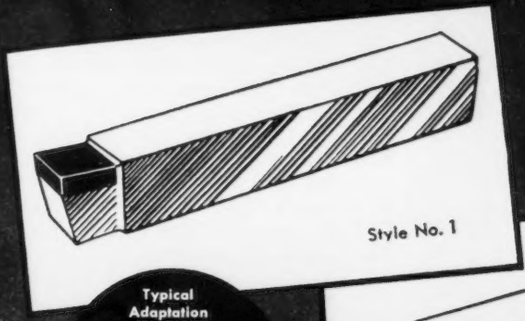
In a session devoted to training and recruitment of industrial personnel, Michael Kane, member of the National Defense Advisory Committee, told the group that all the employables of the reservoir of unemployed have been pretty well absorbed into industry or will be by August when the real pinch in labor supply will be felt. Mr. Kane warned against piracy of workers from other plants and said that the only answer to the problem is training in industry. The schools can only take off the rough edges. Proper training procedure should result in a better understanding between workers and management. As the new workers come in, the older workers should be up graded, and not sidetracked or bypassed by new recruits to industry.

Dr. Alonzo Grace, Commissioner of Education of Connecticut, told of the Connecticut Plan of emergency training. In this plan, carefully selected trainees are given a 200 hr. course in which they are familiarized with 27 different machine tool operations. Through the use of aptitude tests, selection has been so efficient that only 67 dropped out or failed on the job out of 5000 trained in this way last year.

Speaking also of long term trends, Dr. Grace pleaded for more vocational training on the secondary level and less training for college. In his State, 75 per cent of youth are taking academic high school courses, but the majority land jobs in industry, or find themselves without training to accept such jobs. Dr. Grace believes that every youngster leav-

WHY WAIT FOR SPECIAL TOOLS?

...It's easy to Grind CARBOLOY STANDARD TOOLS to meet many special requirements... and you get them *fast!*



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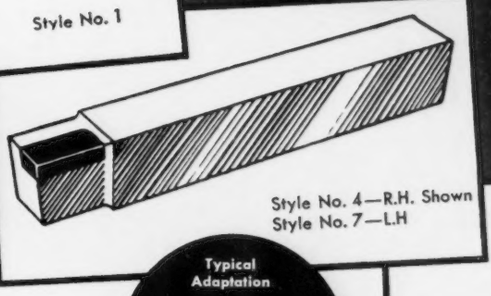

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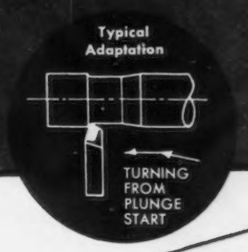
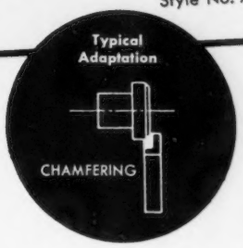
Style No. 7—L.H





Style No. 13—R.H. Shown
Style No. 14—L.H.

Need carbide tools *FAST*? Machines tied up—or *slowed* up—awaiting tool deliveries?

Carboloy *STANDARD* tools may be the answer...

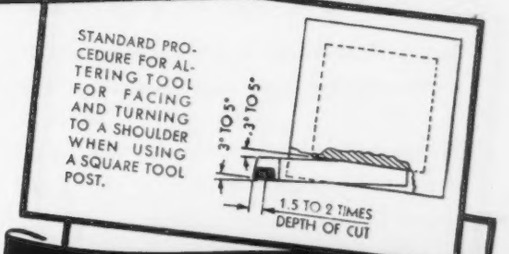
Suitable—in the form you receive them—for 80% of all turning, boring, facing jobs on steel, cast iron, etc., Carboloy *STANDARD* tools can be quickly adapted, when necessary, to meet special requirements such as chamfering, grooving, undercutting, etc. All have **LARGE** tips to permit variation.

To change Carboloy STANDARD tools for special uses you simply grind—in your tool room—following the same fast, simple grinding methods used for re-grinding Carboloy tools. Many plants now maintain a stock of Carboloy STANDARD tools for quick adaptation to special shapes—as well as for daily use in standard forms.

This is important: If you have not already checked to see how many of your present carbide tool requirements can easily conform with STANDARD tool specifications, do so now. You'll save on initial tool cost—and eliminate needless delays.

Carboloy STANDARD tools are available in five styles and three grades, one for steel cutting, two for cast iron, brass, etc. You get them *FAST*, and at prices close to *steel tools*.

Send for catalog sheets GT-125.


STANDARD PROCEDURE FOR ALTERING TOOL FOR FACING AND TURNING TO A SHOULDER WHEN USING A SQUARE TOOL POST.
3° TO 5°
3° TO 5°
1.5 TO 2 TIMES DEPTH OF CUT

FOR EMERGENCY TOOLING... MAKE YOUR OWN

Order Standard Carboloy Blanks—available for rapid delivery. You mill or grind a recess in your tool shank—and braze in the standard Carboloy blank. Then grind—as easily as you now REGRIND—and the tool is ready for use.

Complete instructions furnished.

STYLE R-100 STYLE R-200

Carboloy standard blanks are furnished in two styles, 65 sizes, and in grades 788 for steel cutting, 44A & 883 for cast iron, aluminum, brass, etc.

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Look for this triangular trade mark on tools you buy. It is your assurance of genuine Carboloy cemented carbide.

CARBOLOY COMPANY, INC., 11153 E. 8 MILE ROAD, DETROIT, MICH.

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VISIT BOOTH 124—MACHINE AND TOOL PROGRESS EXHIBITION—DETROIT—MARCH 25-29, 1941

For salvage welding of carbon chrome, and carbon moly castings or other cast alloys of similar characteristics which are to be heat treated after welding. (Note the treatment of welded shrink cracks on heavy plate at right.)

"HARNIMOLY"—

Easily Machined in As-Welded State . . . Responds to flame hardening or heat treatment, up to hardness of 415 Brinell.

When used in repairing during heat treatment of metals similar to those above, "Harnimoly" makes it possible to obtain virtually the same characteristics as the parent metal in impact values.

P&H "Oven Dry" KEPT IN AIR-TIGHT CONTAINERS

WELDING ELECTRODES

To get all the facts about applications and procedures with P&H "Harnimoly," call your nearest P&H welding representative. Or write us.

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WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

Arms Expenditures To Reach $30 Billions

• • • **Present military expenditures of $12,500,000,000 will accelerate to a total of $30 billions in the next 9½ months, R. L. Mehornay said at the ASME meeting in Cleveland. Of the present amount, $2,250,000,000 is going into aircraft; $5 billions into ships, and the remainder into everything else, including $1.5 billions for new plants and $400,000,000 for expansion of existing plants. The additional $17.5 billions will not be spent on aircraft or fighting ships but on supplies and the like before the end of 1941.**

ing school today should be able to do something with his hands.

Considerable discussion took place as to the restrictions of the Wage-Hour Law on training in industry. One manager was told he would have to pay workers time and a half for training outside regular working hours. Mr. Kane replied that the guiding principle of this ruling was whether or not such training was directly related to the job or not. If the employee was required to undergo such trade training in order to hold his job, he must be paid for his training time, whether the training was given in the plant or in a public school. If, however, the training was for the purpose of upgrading him to a higher skill, he need not be paid for the time in training, provided he took the course voluntarily.

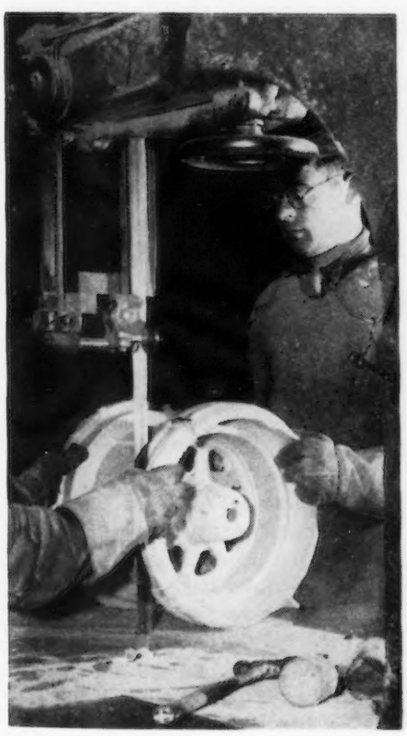
In another session, devoted to a discussion of ammunition manufacture, Dr. Max Kronenberg, Cincinnati Milling Machine Co., illustrated by charts how speed, feed, depth of cut, tool life and horsepower could be correlated in turning shell forgings made of SAE 1035 steel. His charts showed that when turning with high speed steel, lower surface cutting speeds and heavier feeds give shorter production times and more output. The horsepower available at the cutting edge is the controlling factor in obtaining maximum output, but high power can only be used effectively with sintered carbide tools. High speed steels are

to be preferred on older, low powered machines.

In discussing Dr. Kronenberg's paper, J. R. Longwell, chief engineer, Carboloy Co., pointed out that not enough attention is being paid to tool changeover time. He urged tool engineers and machine tool designers to make arrangements for quick tool changes through the use of simple tool setting fixtures and gages. The tool life per grind is unimportant, if tool changeover is fast, he concluded.

Philip McKenna, president, McKenna Metals Corp., pointed out that in cutting steel with carbide tools there are critical cutting speeds, below which it is not safe to go. Under these circumstances, tool life can often be greatly improved by increasing the cutting speed.

20 FOLD INCREASE: Output of magnesium castings has been increased to 20 times normal demand (say in 1938) by American Magnesium Corp., Aluminum Co. of America subsidiary. This photo shows workmen in the magnesium company's Cleveland plant trimming "gates" and "risers" from a sand casting for aircraft.



HOW TO GET STEEL *faster!*

If you are troubled with delayed steel deliveries, here's a timely suggestion that may help you:

Why not overhaul your steel specifications? Today, some steels are easier to get than others. Among these more available steels, Frasse engineers may find a suitable substitute for your "spec"—may be able to save *weeks* for you.

Frasse engineers, by suggesting permissible changes in specifications, have already opened many bottlenecks for steel users. For example—a recent recommendation* (a slight change in analysis) enabled a buyer to get mill shipment 3 weeks earlier than first promised!

Why not check your "spec" with a Frasse engineer? There's no charge—no obligation. His time is yours for the asking. Write or call Frasse Technical Service today!

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SAE ALLOY STEELS • COLD FINISHED BARS • TOOL STEELS
DRILL ROD • MUSIC WIRE • C.R. STRIP AND SHEETS

"YOU SEE, I *KNOW* THIS STEEL WILL DO THE JOB—"

That's what more and more steel users are saying about ELASTUF Steels, and with good reason. They *know* what they're working with, for all ELASTUF Steels have published physicals in sizes up to 8". They *know* they can depend on uniform hardness and strength for finished parts of unequal diameters. They *know* they can confidently predict performance, for all these steels are machinable in ready-for-use condition, eliminating the hazards of heat treatment.

An example of what this knowledge means to the user is the case of a contractor using steam shovels. This contractor more than tripled the life of the shovels' huge swing shafts by selecting ELASTUF TYPE A Alloy Machinery Steel, based on its known physicals. These shafts, which must resist tremendous transverse strains, are now machined from 8" stock and put directly to work without further heat treatment.

Use *your* Machinery Steel Selector—and depend on ELASTUF Steels. For more information, write to the nearest distributor listed below.

7 OTHER REASONS THAT RECOMMEND ELASTUF STEELS TO YOU.

1. Proven performance.
2. Known physicals.
3. Machinable in ready-for-use condition, eliminating extra heat treatment.
4. A single related group covering all machinery steel uses.
5. Consistent uniformity through controlled production.
6. No premium in cost.
7. Always available at nearby points.

Selector Ends Guesswork

By giving steel data in terms of ready-for-use physicals, the Machinery Steel Selector enables you to pick the right steel in any size up to 8" without guesswork. Use your Selector—for another one, write the nearest point listed below.

ELASTUF STEELS

STOCKS LOCATED AT CONVENIENT EASTERN POINTS

BEALS-McCARTHY & ROGERS • **BUFFALO-ROCHESTER**
BROWN-WALES CO. • **BOSTON, MASS.-LEWISTON, ME.**
HORACE T. POTTS CO. • **PHILADELPHIA-BALTIMORE**

C-I Will Increase Armor Plate Capacity

Washington

• • • **The Navy Department** last week awarded two contracts aggregating $3,307,100 to the Carnegie-Illinois Steel Corp. for installation at the corporation's Munhall, Pa., and Mingo Junction, Ohio, plants of additional facilities and equipment to produce armor and special treatment steel. The cost of additional facilities and equipment will be $1,310,000 for the Munhall plant and $1,997,000 for the Mingo Junction plant. Each contract requires that the facilities and equipment be acquired and installed at actual cost without profit or fee to the corporation which will retain title to the additional facilities and equipment but will be reimbursed by the government for their actual cost in 60 days, monthly payments commencing upon completion of the acquisition and installation.

At such time as the additional equipment and facilities are no longer necessary for the purposes of the national defense, the contractor has the option of purchasing them at their then appraised value or of turning them over to the government. If the contractor elects to turn them over to the government, the government then has an option to require the contractor to maintain them at the government's expense for a period of five years or such lesser period as may be determined by the Secretary of the Navy.

Speed-up Meeting Slated For Workers of Drills, Dies

Washington

• • • **All known manufacturers** of drills and reamers, taps, dies, and cutters have been invited to attend a meeting on March 27 with officials of OPM's tools division to discuss methods for stimulating production of these products in the interest of national defense. Up for consideration at an all-day session will be simplification, greater standardization, increasing employees in the industry, enlarging floor space and other related subjects.

50c Minimum Wage In Die Casting Plants

Washington

• • • **A minimum wage** of 50c an hr. for employees in the die casting industry will become effective April 5 for members of the industry who contract with the government after that date. This is the gist of an order issued last week by the Labor Department's Public Contracts Division.

The order, issued under authority of the Walsh-Healey Public Contracts Act, permits apprentices to be employed at lower rates, and learners, not exceeding 5 per cent of the total number of workers in any one establishment, may be employed at 40c an hour, or $16 a week during a 60-day period.

For purposes of the order, the die casting industry is defined to mean "that industry which manufactures die castings for sale, and does not include the manufacture of die castings when incorporated into another product by the manufacturer of such other products." The item "die casting" as used in the order describes "a casting made by forcing molten metal under pressure into a metallic mold or die."

Buick Subcontracts Plane Engine Work

Chicago

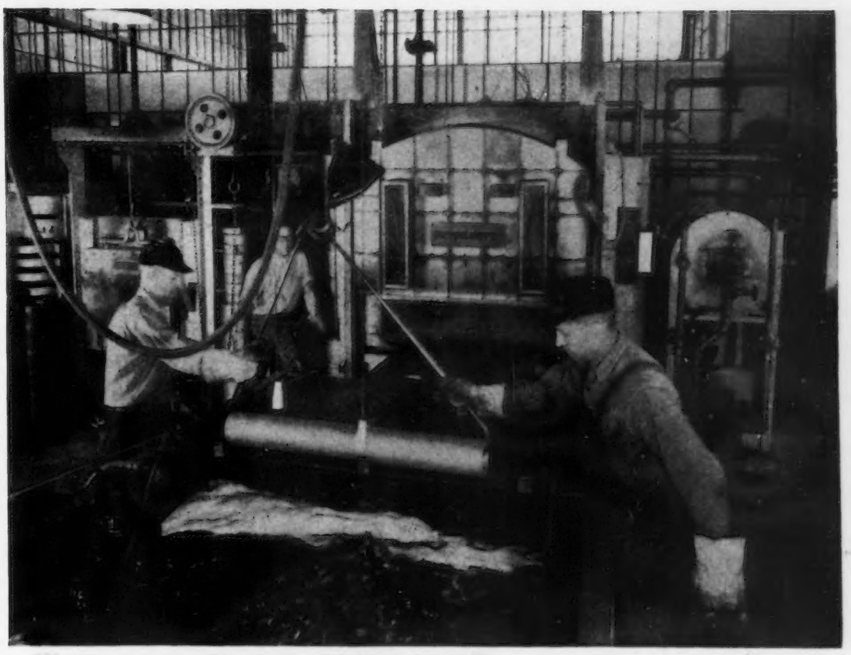
• • • **Subcontracting work** on aircraft engines to be built here by Buick has already started, although the Buick plant will not be finished until mid-summer. Large order for precision gears has been placed with Foote Bros. Gear & Machine Corp. by Buick, who will build the Pratt & Whitney 1200 hp. engine. Foote Bros. has just completed a $2,000,000 gear plant, according to W. A. Barr, president.

Booklet Describes Plant Blackouts

A booklet on "Protected Construction" (blackout plants) is being prepared, Col. James L. Walsh, chairman of the A.S.M.E. Committee on National Defense, revealed at the Cleveland meeting of the society last week.

SAFETY

begins in the heat treat . . .



and that's where HOUGHTON comes in

Safety in the air depends largely upon the modern heat treatment accorded modern metals . . . and the climax is in the quench. Houghton's Soluble Quenching Oils, of course! They're always uniform, providing reliable hardening year in and year out, without change in their composition. In the tank above is oil used to harden tubular steel landing gear parts . . . oil which had been in service fourteen years when the photo was taken. There's a Houghton quenching oil for every required speed, every need. Write E. F. HOUGHTON & CO., Philadelphia, Chicago or Detroit, for the quenching Handbook.

HOUGHTON'S QUENCHING OILS

3rd Annual Foremen's Meeting To Draw 2500

• • • **The third annual** Foremen's Conference, sponsored by the Extension Service of the University of Michigan, the National Association of Foremen and the Foremen's Clubs of Michigan and Ohio, will be staged at Ann Arbor, Mich., on Saturday, April 19.

Charles R. Hook, president, American Rolling Mill Co., will speak on "The Foreman's Part in National Defense" and De Loss Walker, associate editor of *Liberty Magazine*, will address the group.

During the day 14 panel type conferences will be held on the following topics: "Foremen's Clubs — Their Organization and Promotion" under leadership of H. J. Baumker, secretary Toledo Foremen's Club; "Personal Contact With Your Men" by Montague Clark, manager, industrial and public relations, United States Rubber Co., Detroit; "Training New Foremen" by Harry Newton Clark, counsel on industrial morale and personnel problems, Cleveland; "The Practical Use of Psychology" by C. S. Coler, industrial relations, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; "The Foremen and His Men Today" by Guy R. Cowing, assistant director, General Motors Institute, Flint, Mich.; "Executive Leadership" by F. M. Dannenfelser, principal, Macomber Vocational High School, Toledo, Ohio; "The Foreman's Place in Job Training" by Russell J. Greenly, chairman, trade and industrial education, Purdue University; "Getting Along With Other Foremen" by G. W. Hanneken, vice president, manufacturing department, Standard Oil Co. of Ohio; "How Do People Learn" by Mitchell J. Kane, consultant, Training Within Industry, Office of Production Management, Washington.

"What Makes the Worker Tick" by A. C. Moore, research organization, Western Electric Co., Chicago; "How to Express Yourself More Effectively" by Arthur Secord, teaching fellow in speech and manager of the Michigan High School Forensic Association, University of Michigan; "The Health of the Factory Worker" by C. D. Selby, M.D., General Motors Corp., Detroit; "How to Handle Group Grievances" by C. E. Weiss, industrial relations manager, Packard Motor Car Co., Detroit; "What Do You Know About the Labor Laws" by Col. Philip B. Fleming, administrator, Wage and Hour Division, Department of Labor, Washington; and a conference subject to be announced which will be under direction of Thomas E. Ducat, Ohio Bell Telephone Co., Akron.

Last year more than 2000 industrial foremen attended the Conference at Ann Arbor. Reservations this year will be accepted up to 2500.

Hot Off the Press!

COMPLETE ENGINEERING DATA on BILLET SHEARS

•

Contains the facts you want to know about these up-to-the-minute machines for fast, accurate cutting of billets, bars and rods . . . Take the first step today to speed up production in the "Cutting department"! Send for NEW Bulletin 3295.

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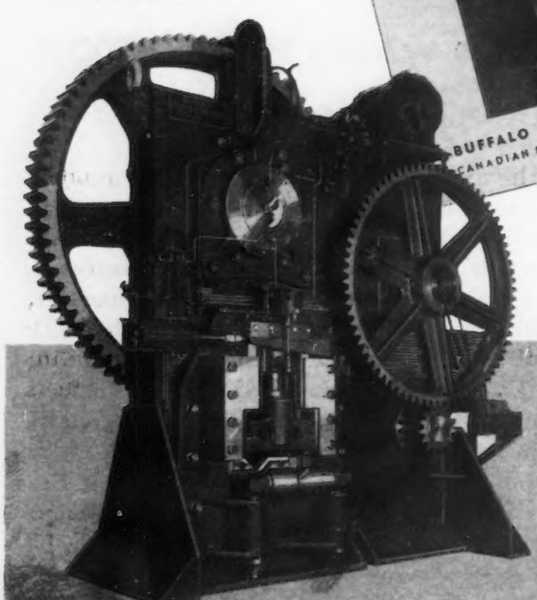

Buffalo Billet Shears are built in eleven sizes—there's a correct size for your requirements.

"Buffalo"
BILLET SHEARS

Vestibule Schools Set Up For Defense Training

Milwaukee

• • • The shortage of workmen who can meet the exacting standards of today's complicated machines has prompted local manufacturers to bring back the vestibule school system, so named in 1917 when many factories in the war rush set up class rooms and training centers in factory vestibules in the absence of more adequate space in the production shops. Such schools have been started by the A. O. Smith Corp., Chain Belt Co., Nordberg Mfg. Co., Allis-Chalmers Mfg. Co. and Harnischfeger Corp.

Industry Soon Will Roll, Knudsen Says

Washington

• • • **"Things will begin** to roll" within the next three or four months, OPM Director General William S. Knudsen told staff members of the production division at an informal meeting last week in the course of discussing defense contracts whose total value awarded by the War and Navy Departments from June 1, 1940, through Jan. 1, 1941, was $12,575,869,000. Since that time the United States and British governments, either directly or indirectly or through tax depreciation provisions, have been instrumental in plant expansions involving 784 plants having an estimated total cost of $2,138,000,000.

Mr. Knudsen pointed out that progress in the production of different types of equipment varies according to decisions reached by the War and Navy Departments regarding the equipment on which the greatest effort should be concentrated. The decisions are effectuated by the use of priorities.

"A priority rating given to a certain item," Mr. Knudsen explained, "is carried through to the various pieces of equipment. For instance, delivery of guns and instruments for airplanes must be made in time to meet production schedules for the completed planes. Also, in the case of ships, the production of propulsion machinery and auxiliaries must be timed with the construction of the completed vessel.

"The problem for the Office of Production Management," Mr. Knudsen stated, "is to be able to allocate equipment for all kinds of material so as to cause the least possible delay to the entire program."

Revision of production schedules may take place from time to time according to decisions of the War and Navy Departments as to the type of military machine best fitted to current defense requirements, Mr. Knudsen stated.

"It is our job," he said, "to get everything the Army and Navy wants when they want it and if that cannot be done to get them what they want in the order of its importance."

Of the total plant expansions, it was stated that the United

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WITH PORCELAIN ENAMEL

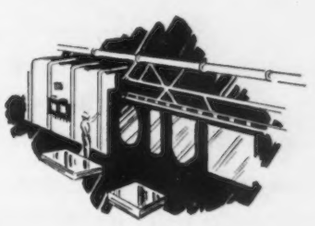
THAT precious something called sales appeal takes on new life when you "dress up" your products in beautiful, durable porcelain enamel. And when you use ARMCO Enameling Iron as a base, sales are sure to benefit by a tremendous backlog of acceptance generated by 27 years of national advertising.

BUYERS have confidence in the ARMCO triangle trademark. This is why so many manufacturers attach the ARMCO label to their porcelain enameled products.

"The World's Standard"

IMPORTANT as it is, sales power is only half the story of ARMCO Enameling Iron. It cuts shop costs too, helps you turn out low-cost work. For many years it has been preferred by enamelers for its high refinement, uniformity, and unsurpassed bonding qualities.

ARMCO Enameling Iron is ductile and forms easily with little or no breakage. For flat work . . . *it enamels flat.*



IF YOUR products would be more serviceable and saleable with a porcelain enamel finish, consider the advantages of using ARMCO Enameling Iron. Write us. The American Rolling Mill Company, 590 Curtis Street, Middletown, Ohio.

ARMCO ENAMELING IRON

States Government, through the Reconstruction Finance Corp., and the Defense Plant Corp. has awarded contracts or issued letters of intent for the construction or expansion of 302 plants at an estimated cost of $1,574,000,000 up to March 1. The British Government has financed expansion of 61 plants in the amount of $171,000,000. Certificates of necessity, which entitle owners of plant facilities to an accelerated rate of depreciation for tax purposes have been approved for the expansion of 421 plants at an estimated cost of $393,000,000. The latter plants are privately financed.

Mr. Knudsen said that between May, 1940, immediately prior to the formation of the National Defense Advisory Commission, and January, 1941, there had been an increase of 1,445,000 persons working in non-agricultural industries. The increase from January, 1940, to January, 1941, was 1,868,000 employees. In manufacturing industries there has been an increase of 968,000 persons from May to January. Most of the increase has been in the durable goods industries in which employment has increased by 721,000 persons or 19 per cent.

Steel Industry Forms Defense Committee

• • • An Iron and Steel Industry Defense Committee is being organized by steel leaders to cooperate with OPM and other government agencies in national defense matters. Benjamin F. Fairless, Jr., president, U. S. Steel Corp., is chairman of the committee which is expected to include directors of the American Iron and Steel Institute. How the group will function is being studied.

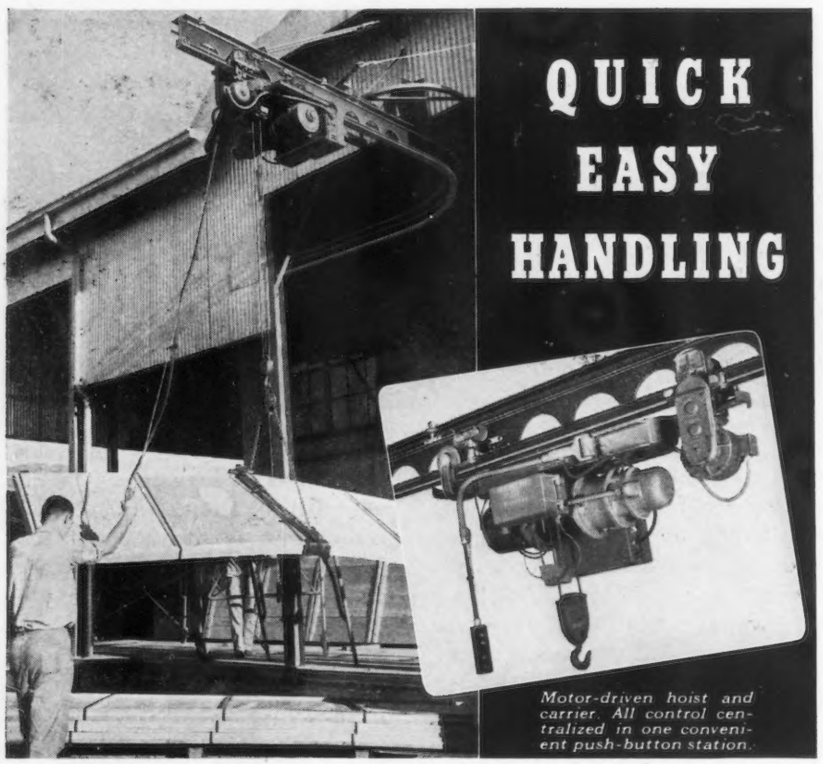
Oilgear Co. Output Gains 150%

Milwaukee

• • • Oilgear Co., Milwaukee manufacturer of fluid drive and broaching machinery, has stepped up production from October, 1939, to January, 1941, about 150 per cent, according to Harry M. Swigart, president, who reported further that while only a small part of the business is obtained from governmental agencies, about 60 per cent of current unfilled orders is from machine tool, hydraulic press and other machinery makers having direct government contracts. A further 25 per cent increase is expected by July.

1110 More Defense Houses Ordered

• • • Contracts for an additional 1110 dwelling units under the national defense housing program were awarded during the week ended March 8. As of March 8, according to the Housing Coordinator, C. F. Palmer, contracts had been let for the construction with public funds of 39,850 dwelling units in 88 localities of 37 states and territories.



Courtesy Lockheed Aircraft Corporation

Long unwieldy boxes of aluminum alloy metal are quickly and easily unloaded and transported to storage with this simple Cleveland Tramrail system.

The arch-beam extension rail connects with an extensive system of transfer bridges within the warehouse where thousands of aluminum sheets are stored.

Hundreds of types of Cleveland Tramrail are available for nearly every materials handling requirement. Capacities to 5 tons.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1115 E. 283rd St. Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT
Other products: CLEVELAND CRANES and STEELWELD MACHINERY

Wheeling Considers New Coke Oven Battery

Wheeling, W. Va.

• • • **The Wheeling Steel Corp.** has under consideration construction of an additional battery of by-product coke ovens at its East Steubenville plant, according to Alexander Glass, chairman, and William W. Holloway, president. Consideration of this project has resulted, it is said, because it is necessary to buy coke at prices greatly in excess of the corporation's cost of production during periods of capacity operations.

Wheeling's sales in 1940 amounted to $93,095,627 compared with $85,716,689 in 1939. Average number of employees in 1940 was 17,113 compared to 16,425 in 1939. Average annual earnings per employee in 1940 amounted to $1,915 as against $1,863 in 1939. Total inventories on Dec. 31, 1940, were valued at $33,926,449, compared with $33,341,943 at the end of 1939.

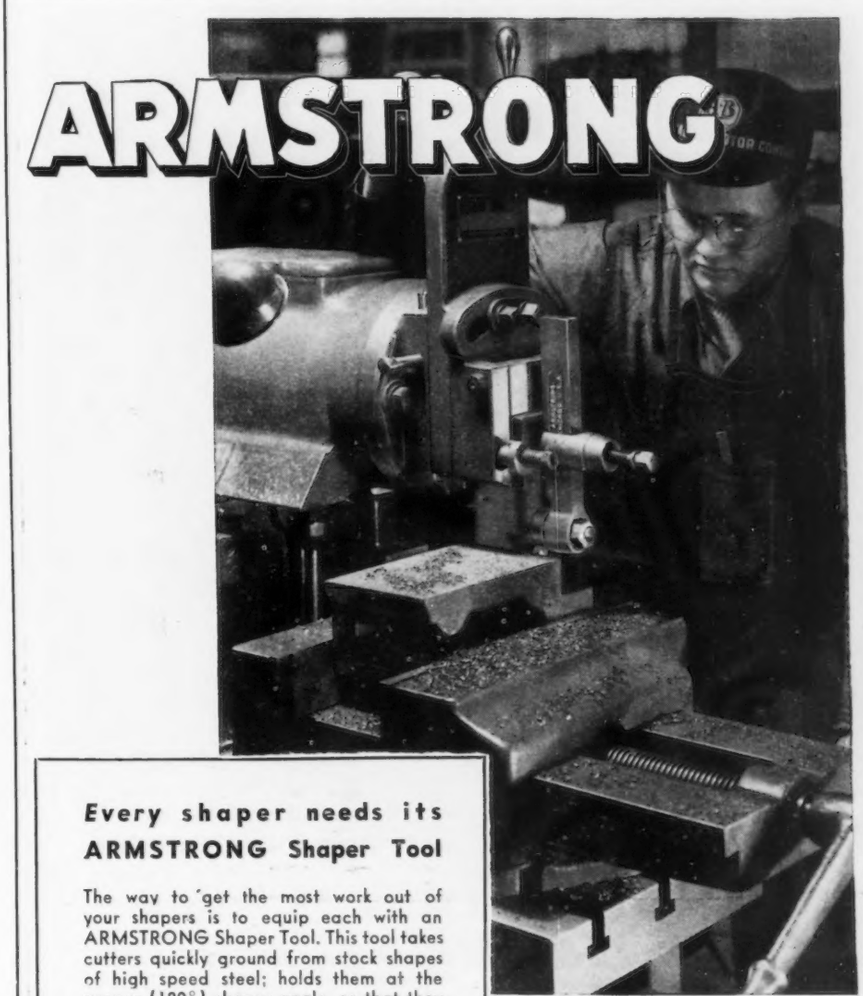
Canada's Steel Plants To Continue Expansion

Toronto

• • • **Despite the large** additions that were made to Canadian plants engaged in primary steel production during 1940, greater expansion is planned for 1941 to provide steel for Canada's rapidly expanding war program. Latest announcement comes from Algoma Steel Corp., Sault Ste. Marie, Ont., which plans an addition to its blooming mill capacity, and also is engaged in making improvements to some other departments. Steel Co. of Canada, Ltd., Hamilton, reports its new plate mill will soon be turning out plate for shipbuilding. The company also is engaged in installing a new 1000-ton blast furnace, which will be completed late this year and operate at estimated daily rate of about 750 tons, practically doubling the company's present pig iron production. The Steel company also is building an addition to its plant at Swansea, just outside Toronto, and has made improvements at its Montreal works. Dominion Steel & Coal Corp., Ltd., Sydney, N. S., plans to install additional open hearth furnaces.

Tennessee Products Corp. Will Expand Coke Plant

• • • **A contract for** expansion of its coke and by-product plant at Chattanooga, Tenn., has been awarded by Tennessee Products Corp. to the Wilputte Coke Oven Corp. of this city. Wilputte is a subsidiary of Semet-Solvay Company, a division of Allied Chemical & Dye Corp. The contract provides for construction of 19 Wilputte Underjet By-Product Coke Ovens of the latest type, together with necessary expansion of the associated by-product and benzol plants. The new ovens will have a yearly capacity of 130,000 tons of coke and will enable the Tennessee Products Corp. to supply additional coke to the Alcoa (Tenn.) plant of the Aluminum Corp. of America.



Every shaper needs its ARMSTRONG Shaper Tool

The way to get the most work out of your shapers is to equip each with an ARMSTRONG Shaper Tool. This tool takes cutters quickly ground from stock shapes of high speed steel; holds them at the proper (180°) shaper angle, so that they require no weakening back grinding. It also holds them in any one of seven positions at any desired clearance, permitting the most efficient approach to the work, often permitting the finishing of top, sides and even undercutting sides without moving the work from the bed. This tool can also be turned around, throwing the cutter behind the line of center for cutting keyway, fine finishing cuts or wherever a "gooseneck" tool is desirable.

Equip every shaper with its ARMSTRONG Shaper Tools, and you will be ready for work, all work, on a moment's notice; turn setting-up and tooling-up time into production time.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
309 N. Francisco Ave., Chicago, U. S. A.
Eastern Warehouse and Sales: 199 Lafayette St., New York

Buy ARMSTRONG TOOLS from your Supply House

Government Awards

Government awards, during the week ended March 8, 1941, as listed by the Public Contracts Division, Department of Labor, follow:

Iron and Steel Products....$8,149,376

Air Associates, Inc., Bendix, N. J.; bolts $16,147

Allegheny Ludlum Steel Corp., Brackenridge, Pa.; steel plates, etc. 310,915

Anchor Post Fence Co., Baltimore; link fence chain 13,097

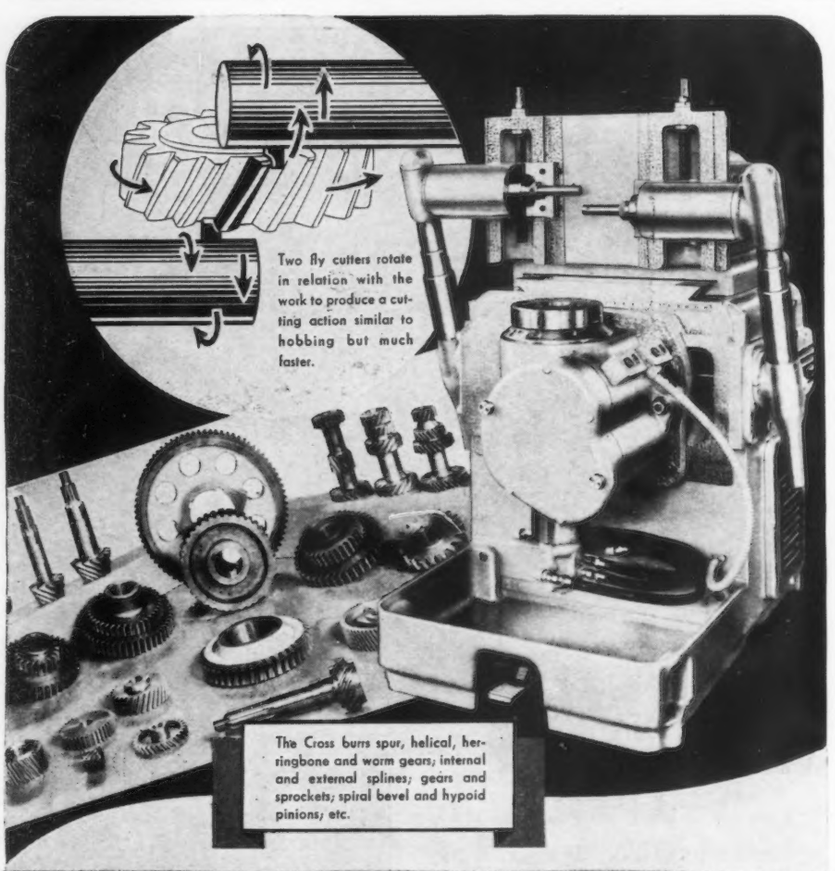
Armco International Corp., Middletown, Ohio; steel culverts .. 36,128

Atlas-Ansonia Co., New Haven, Conn.; oilers 20,618

Babcock & Wilcox Tube Co., Beaver Falls, Pa.; steel tubing. 19,460

Bayonne Steel Co., Long Island City, N. Y.; sheet steel 16,279

Bethlehem Steel Co., Bethlehem, Pa.; bar steel 12,273
steel 10,840


Two fly cutters rotate in relation with the work to produce a cutting action similar to hobbing but much faster.
The Cross burrs spur, helical, herringbone and worm gears; internal and external splines; gears and sprockets; spiral bevel and hypoid pinions; etc.

THE NO. 73 CROSS
Gear Burring Machine

A Universal Burring and Chamfering Machine for spur, helical, spiral bevel and hypoid gears. Both ends of the teeth are finished in one setting and at the same time—Easy to set-up, fast and economical.

Literature upon Request.

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Established in 1898
DETROIT, MICHIGAN, U.S.A.

Blaw-Knox Co., Inc., Pittsburgh; road forms 18,141

Bohn Aluminum & Brass Corp., Detroit; metal fuze parts 339,300

Bolt & Nut Div., Republic Steel Corp., Cleveland; bolts and nuts 93,714

Briggs Mfg. Co., Detroit; steel lavatory 92,807

Buda Co., Harvey, Ill.; valves and assys. 16,729

Edw. G. Budd Mfg. Co., Philadelphia; smoke pipes 567,862

Calif. Steel Products Co., San Francisco; mooring buoys 83,069

Capitol Steel Corp. of N. Y., New York; reinforcing steel bars .. 12,770

Carnegie-Illinois Steel Corp., Pittsburgh; steel sheets 82,782
steel 10,837

Carpenter Steel Co., Reading, Pa.; pipe and tubing 34,971

Columbian Steel Tank Co., Kansas City; mooring buoys 91,672

Corbin Cabinet Lock Co., American Hardware Corp., Succ., New Britain, Conn.; locks 24,301

Crane Co., San Francisco; copper nickel flanges 24,674
steel valves 30,624

Crucible Steel Co. of America, New York; steel 75,947

Diamond Calk Horseshoe Co., Duluth; wrenches 12,100

Eaton Mfg. Co., Wilcox-Rich Div., Detroit; valves and seats 12,758

Estate Stove Co., Hamilton, Ohio; ranges 70,507

General Machinery & Supply Co., San Francisco; steel pipe 14,727
wrenches 13,591

Louis Hanssen's Sons, Davenport, Iowa; steel cable 26,949

Hart Mfg. Co., Louisville; ranges. 39,885

Heller Bros. Co., Newark; motor maintenance equipment 11,080

Hurd Lock & Mfg. Co., Almont, Mich.; locks 87,863

Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.; stove parts.. 13,658

Kraeuter & Co., Inc., Newark; motor maintenance 18,200

Aleck Leitman, an individual trading as Lite Mfg. Co., New York; flyer's sustenance cases 37,896

Lundquist Tool & Mfg. Co., Worcester; reel control box ... 59,481

Mosler Safe Co., Hamilton, Ohio; safes 48,145

Henry Moss & Co., Inc., Brooklyn; stencils 13,860

Nicholson File Co., Providence; files and rasps 10,320

Oliver Iron & Steel Co., Pittsburgh; bolts and nuts 119,330

Peck, Stow & Wilcox Co., Southington, Conn.; motor maint. equipment 22,250

Pheoll Mfg. Co., Chicago; screws and nuts 153,427

Pittsburgh Screw & Bolt Corp., Pittsburgh; practice bombs 19,350

Presto Gas Mfg. Co., Chicago; range parts, utensils 12,751

Quincy Stove Mfg. Co., Quincy, Ill.; stove parts 25,945

Reed Mfg. Co., Erie, Pa.; wrenches 13,379

Reed & Prince Mfg. Co., Worcester; wood screws 136,002

Republic Steel Corp., Massillon, Ohio; steel, bar 68,980
steel 31,066

Rhode Island Tool Co., Providence; stud bolts 20,653

Rotary Electric Steel Co., Detroit; steel 23,028
steel 26,341

Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.; bolts and nuts 13,106
machine bolts 18,045

Rustless Iron & Steel Corp., Baltimore; steel 25,637

Savory, Inc., Newark; pie plates. 26,406

Scovill Mfg. Co., Waterbury, Conn.; fuzes 3,780,000

Wm. Scrimgeour, Washington; sheet steel 11,051
Snap-On-Tools Corp., Kenosha, Wis.; motor maintenance equipment 96,510
Standard Products Co., Detroit; grommets 109,200
Stanley Tool Div., Stanley Works, New Britain, Conn.; motor maintenance equipment 21,690
Thomas Steel Co., Warren, Ohio; cold rolled steel 11,840
Timken Roller Bearing Co., Canton, Ohio; bar steel 24,710
steel 13,107
Tubular Service Corp., Philadelphia; seamless steel tubing 13,101
Unique Specialties, Inc., New York; brass fuze holders 64,041.25
Universal Sanitary Mfg. Co., New Castle, Pa.; water closet combination 54,300
Upson-Walton Co., Cleveland; blocks 20,000
Wallace Barnes Co. Div., Associated Spring Corp., Bristol, Conn.; operating rod springs .. 72,946
Wallingford Steel Co., Wallingford, Conn.; steel 49,481
Westinghouse Elec. Supply Co., San Francisco; fittings for tubing 15,992
Winchester Repeating Arms Co., Div. of Western Cartridge Co., New Haven, Conn.; rifles, target 28,047
Woodhaven Metal Stamping Co., Inc., Brooklyn; light wells 15,000
Worcester Taper Pin Co., Worcester, Mass.; brass fuze holders.. 36,300
Worden-Allen Co., Milwaukee; fabricated structural steel 49,800
Wrought Iron Range Co., St. Louis; ranges 41,250
Wyckoff Drawn Steel Co., Pittsburgh; steel bar 115,460
Youngstown Sheet & Tube Co., Youngstown, Ohio; zinc coated. 43,468

Nonferrous Metals and Alloys $1,623,661

Aluminum Co. of America, Washington; ingot aluminum alloy .. $17,310
Aluminum Cooking Utensil Co., New Kensington, Pa.; aluminum dish pans 130,560
American Brass Co., Waterbury, Conn.; cartridge brass cups ... 48,360
cartridge brass 14,652
bullet jacket cups 724,354
condenser tubes 67,293
seamless brass tubing 39,311
American-La France-Foamite Corp., Elmira, N. Y.; fire extinguishers 99,052
Bridgeport Rolling Mills Co., Bridgeport, Conn.; gilding metal 46,120
Chase Brass & Copper Co., Inc., Waterbury, Conn.; seamless brass tubing 11,672
copper tubing 12,388
C-O-Two Fire Equipment Co., Newark; fire extinguishers 11,915
Federated Metals Div., American Smelting & Refining Co., Seattle; copper ingot 24,668
S. M. Howes Co., Boston; bronze castings 33,264
International Engineering, Inc., Dayton, Ohio; marker lamp assys. 31,350
Lewin Mathes Co., E. St. Louis, Ill.; copper tubing 18,857
Mueller Brass Co., Port Huron, Mich.; brass rod 89,599
Pa. Flexible Metallic Tubing Co., Philadelphia; bronze steam hose 22,510
Phelps Dodge Copper Prod. Corp., British American Tube Div., New York; condenser tubes 146,610
Revere Copper & Brass, Inc., Baltimore Div., Baltimore; condenser tubes 20,726

Other Machinery $7,275,835

Allen-Sherman-Hoff Co., Philadelphia; slag handling equipment.. $49,732
American Brake Shoe & Foundry Co., Brake Shoe & Castings Div., New York; iron castings 30,922
American Car & Foundry Co., New York; idler, trailing, and parts 13,296
Air Reduction Sales Co., New York; tractor truck 14,869
Alemite Co. of Maryland, Baltimore; pressure lubricating gun fittings 59,776
Armstrong Cork Co., Pittsburgh; machining steel 355,334
Austin-Hastings Co., Inc., Cambridge, Mass.; hack saw machs.. 14,126
Barwood & Co., Philadelphia; gages 20,457
Bay City Shovel, Inc., Bay City, Mich.; crane mounted truck ... 13,000
Blackburn-Smith Mfg. Co., Inc., Hoboken, N. J.; cast steel strainers 10,452
Blue Ridge Mach. & Supply Co., Asheville, N. C.; lathe 13,716
J. Edward Bolich, Philadelphia; parts for control equipment ... 17,496
Buffalo Forge Co., Buffalo; heaters and fans 11,671
Buffalo Scale Co., Inc., Buffalo; scales 19,250

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twice—first, from an outside source; then, from your own machining and finishing departments. Perhaps you have discovered that what a forging costs at the point of delivery is only part of the cost at the point of assembly. T&W forgings are worth a bit more at the point of delivery because they usually cost less at the point of assembly. Ask a T & W Forging Engineer to show you why this is.

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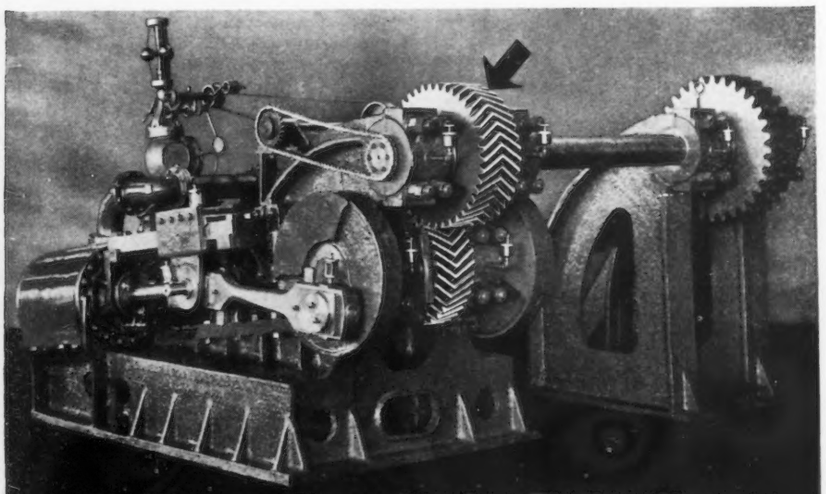
Caterpillar Tractor Co., Peoria, Ill.; crawler tractors 45,420
Cincinnati Ball Crank Co., Cincinnati; funnel and measure 14,670
Cincinnati Shaper Co., Cincinnati; press brake 42,774
Clearing Machine Corp., Chicago; presses 50,390
Cleveland Automatic Mach. Co., Cleveland; lathes 71,534
Clyde Iron Works, Duluth, Minn.; steam winches 32,630
Colson-Merriam Co., Washington; elec. food conveyors 14,435
Commercial Engineering Co., Washington; centrifugal purifiers 26,721
oil purifiers 89,994
Cowles Tool Co., Cleveland; thread mills, cutters 12,039
Curtis Mfg. Co., St. Louis, Mo.; air compressors 45,724
Denison Engineering Co., Columbus, Ohio; painting and conveying equipment 26,490
Detroit Bevel Gear Co., Detroit; gears 47,528
Dorsey C. Anderson, Philadelphia; welders 27,090
Dravo Corp., Philadelphia; propelling unit pts. 37,740
Drying Systems, Inc., Chicago; heating and ventilating units .. 12,500



McKiernan-Terry Dredge Engine Uses
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for Greater Strength and Durability

An important factor in the ruggedness of the McKiernan-Terry 750 H.P. cutter engine shown above is the use of Farrel-Sykes continuous tooth herringbone gears, which contribute greatly to dependable performance and long life under severe operating conditions.

Farrel-Sykes gears are proportioned for extra strength and load-carrying capacity to withstand shocks, stresses and wear. Precision generation by the famous Sykes process makes them exceptionally quiet and smooth-running. Their combined characteristics of overlap or interlacing of the teeth, gradual engagement and inclined line of pressure also contribute to smooth, quiet operation, retard wear and maintain the involute profile and correct tooth action throughout the life of the gears.

Opposed helices balance and absorb axial thrust within the gear member, preventing harmful thrust loads and resultant stresses on other parts of the machinery.

We have exceptional facilities at our Buffalo plant for making gears, gear units and flexible couplings for any application and in any capacity. Our engineers offer experienced counsel and expert assistance in your gear problems. For further information, descriptive catalogs and engineering data please write to the address below.

FARREL-BIRMINGHAM COMPANY, Inc.
333 VULCAN STREET . . . . . BUFFALO, N. Y.
FARREL SYKES GEARS
The Gear with a Backbone

John F. Duby Co., Dorchester, Mass.; gage 13,170
Enterprise Tool & Gear Corp., Detroit; gears and worms 164,085
Evinrude Motors, Div. of Outboard, Marine & Mfg. Co., Milwaukee; outboard motors 65,129
General Bronze Corp., Long Island City, N. Y.; dolly assys. 321,570
General Electric Co., Schenectady; diesel locomotives 48,330
General Machinery Corp., Hamilton, Ohio; rifling machines 92,355
General Motors Corp., Cleveland Diesel Engine Div., New York; diesel engine parts 23,498
generator sets 152,427
General Motors Corp., Delco Prod. Div., Dayton, Ohio; fuze, shell. 1,605,737
General Motors Corp., Harrison Radiator Div., Lockport, N. Y.; coolers, oil-air tube 27,861
Greenfield Tap & Die Corp., Greenfield, Mass.; drills 11,020
Hadley Special Tool Co., Inc., Boston; trigger release assy., tools. 15,767
carbon removing tools 38,539
R. L. Harris, Inc., Knoxville, Tenn.; tractors, power control units 32,815
Hussmann-Ligonier Co., St. Louis; ice cooled refrigerators 95,800
Ideal Stencil Machine Co., Belleville, Ill.; stencil cutting mach. Indefinite
Ingersoll-Rand Co., Washington; compressors, air 380,771
drills, portable 15,654
Ingersoll Milling Mach. Co., Rockford, Ill.; milling mach. 175,500
Insinger Machine Co., Philadelphia; washing machines 11,360
Jensen Mfg. Co., Palmyra, N. J.; laundry equip. 61,018
Kearfott Engineering Co., Inc., New York; pendulum type wipers 10,500
Kearney & Trecker Corp., Milwaukee; milling machines 40,496
Kux-Lohner Machine Co., Chicago; tablet press 106,390
Lakeside Bridge & Steel Co., Milwaukee; gantry crane 98,750
R. G. LeTourneau, Inc., Peoria, Ill.; carryall scrapers 27,270
Levene Motor Co., Philadelphia; valve lifters 15,730
Linde Air Products Co., Baltimore; oxy-acetylene torches 171,420
Lloyd & Arms, Inc., Philadelphia; piston ring machs. 14,736
engine lathes 15,552
radial drills 17,255
Lynchburg Foundry Co., Lynchburg, Va.; cast iron pipe 52,639
Machinery Builders, Inc., Long Island City, N. Y.; presses 12,352
Magnus Tool & Die Co., Newark; loading guides, punches, etc. ... 13,900
Marsh Stencil Machine Co., Belleville, Ill.; stencil cutting mach. Indefinite
W. L. Maxson Corp., New York; range drums 20,945
Mine Safety Appliance Co., Pittsburgh; tool parts 109,790
National Marking Mach. Co., Cincinnati; marking machines 75,690
Oliver Machinery Co., New York; sanders, endless bed 24,730
Packard Motor Car Co., Detroit; cutouts for engines 17,100
Parker Appliance Co., Cleveland; cable testing machines 14,000
Penn. Tool & Mfg. Co., York, Pa.; gages 23,675
Pettibone Mulliken Corp., Chicago; dredge pump 29,286
F. J. Pierce, Pasadena, Cal.; outboard motor 52,090
Pump Engineering Service Corp., Cleveland; test stands 39,675
Ritter Pattern & Casting Co., Inc., New York; gray iron castings.. 17,677
John Reiner & Co., Inc., Long Island City, N. Y.; diesel generator sets 280,286

More Magnesium Plants Proposed

Washington

• • • In discussing the $3,446,685,144 navy supply bill in the House last week, Representative Scrugham, of Nevada, Chairman of the Appropriations Naval Subcommittee, said that the committee had found some shortage in the lighter metals, particularly magnesium. He added that he had come to the conclusion that one or more plants should be authorized to be built by Congress, preferably to use the so-called Farber process and to be located at sites "where ample cheap hydroelectric energy is available."

Remington Arms Co., Inc., Bridgeport, Conn.; rifles and parts .. 29,992
Rockford Drilling Mach. Div., Borg-Warner Corp., Rockford, Ill.; clutch assy., transmission. 59,301
Stanley P. Rockwell Co., Inc., Hartford; oven type furnaces .. 10,500
Seymour Products Co., Seymour, Conn.; sub-machine gun parts .. 67,045
Sherwood Brass Works, Detroit; diesel engine parts 65,836
W. E. Shipley Machinery Co., Philadelphia; grinding machines 12,639
Sparks-Withington Co., Jackson, Mich.; bomb hoist assys. 297,000
Strong, Carlisle & Hammond Co., Cleveland; boring machine and bars 11,890
Sunroc Spring Water Co., Media, Pa.; coolers 44,925
Tannewitz Works, Grand Rapids, Mich.; band saws 16,336
Taylor Machine Co., Cleveland; bomb hoist assys. 219,300
Taylor-Parker Co., Inc., Norfolk, Va.; cutters and saws, milling. 28,226
Thew Shovel Co., Lorain, Ohio; power shovel 10,788
U. S. Axle Co., Inc., Pottstown, Pa.; dummy trucks 41,150
United States Elec. Tool Co., Cincinnati; elec. portable drills .. 13,500
United States Motors Corp., Oshkosh, Wis.; power units 72,555
Walker Mfg. Co., Racine, Wis.; jacks 17,310
Warner Elec. Brake Mfg. Co., Beloit, Wis.; electric brake units 59,991
Warner & Swasey Co., Cleveland; lathe 17,720
Warren Steam Pump Co., Inc., Warren, Mass.; fire and bilge pumps 90,600
Waterbury Farrel Foundry & Mach. Co., Waterbury, Conn.; machines 71,138
Wellman Engineering Co., Cleveland; gun mount 13,181
Winter Weiss Co., Denver; two wheel boat trailers 17,971
Zollner Machine Works, Inc., Fort Wayne, Ind.; diesel engine parts 32,658

Navy Dept., Bureau of Supplies and Accounts:

Anaconda Wire & Cable Co., New York; cable, electric $28,544
Atlas Diesel Engine Corp., New York; engine, diesel, marine ... 21,193
Brown & Sharpe Mfg. Co., Providence; machine, milling 7,926
Bryant Machinery & Engrg. Co., Chicago; machines, drilling and tapping 12,902
Buffalo Forge Co., Buffalo; roll, bending, motor-driven 10,382
Chambersburg Engineering Co., Chambersburg, Pa.; machines, stamping 12,905
Climax Engineering Co., Clinton, Iowa; plants, generating 21,399
Cone Automatic Machine Co., Inc., Windsor, Vt.; machines, screw, automatic, motor driven 28,196
Crane Co., Washington; valves, bronze and composition 49,759
Delta Electric Co., Marion, Ind.; lanterns, without lamps or batteries 63,490
General Motors Corp., Cleveland Diesel Engine Division, Cleveland; reconditioning of main propulsion engines 97,304
Gould & Eberhardt, Newark; shapers, universal, heavy duty 7,242
Gray Marine Motor Co., Detroit; engines, marine, gasoline 6,000
Imperial Machine & Foundry Corp., Lindenhurst, L. I., N. Y.; machines, vegetable peeling 29,492
Ingersoll-Rand Co., Washington; compressor, air 6,582
McKiernan-Terry Corp., Harrison, N. J.; windlasses, anchor 260,773
Midvale Co., Washington; forgings, steel 667,982

DON'T YOU HEAR

THAT WHISTLE

BLOWIN'?

• The chances are, if you're in the metal finishing department you *don't* hear the five o'clock whistle.

If you hear it, you probably don't heed it. Metal finishers don't work by the clock. They work by the job.

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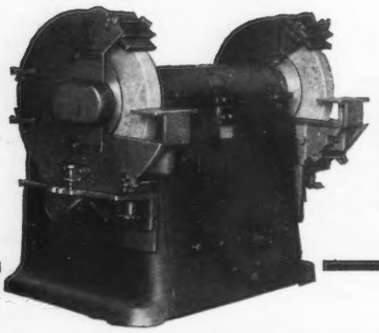

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Pioneer Instrument Division, Bendix Aviation Corp., Bendix, N. J.; barometers, mercurial	14,340
Revere Copper & Brass, Inc., Baltimore Div., Baltimore, Md.: tubes, condenser	17,589
brass, naval, rolled	44,799
alloy	84,255
Sciaky Corp., Chicago; machines, welding and cabinets	53,995
Scott Valve Mfg. Co., Washington; valves, composition	17,005
Seagrave Corp., Columbus, Ohio; engine, fire, pumping	5,500
Wm. Sellers & Co., Inc., Philadelphia; planer, plate, heavy duty	79,400

Youngstown Ordnance District Office Opened

Youngstown, Ohio

• • • A Youngstown branch of the Cleveland ordnance district has been opened with Lieut. M. W. Helm in charge. It is in the Mahoning County courthouse.

SKF Industries, Inc., Philadelphia: bearings, ball	5,157
Sperry Gyroscope Co., Inc., Brooklyn; equipments, gyro compass	321,117
United States Motors Corp., Oshkosh, Wis.; sets, generator, gasoline engine driven	10,165
Van der Horst Corp. of America, Olean, N. Y.; liners, chromium plated	72,576
Worthington Pump & Machy. Corp., Washington; compressors, air	392,820

War Dept., Other Agencies:

American Fork & Hoe Co., Charleston, W. Va.; axes	$1,136
American-La France-Foamite Corp., Elmira, N. Y.; fire extinguishers	487
Black & Decker Mfg. Co., Towson, Md.; valve-seat grinders	522
drills and grinders	384
Cleveland Pneumatic Tool Co., Cleveland; machinery and equipment for airplane parts plant	3,739,000
Cook Electric Co., 2700 Southport, Ave., Chicago; jacks	940
Curtis Mfg. Co., St. Louis; compressors	241
Dow Chemical Co., Freeport, Texas; new plant, machinery and equipment	8,007,407
Factory & Yard Supply Co., New York; tools	307
Garfield Electric Supply Co., Hillside, N. J.; cable	402
Harley-Davidson, Milwaukee; motorcycles	870,360
Indian Motorcycle, Springfield, Mass.; motorcycles	857,600
Lauson Co., New Holstein, Wis.; springs	467
Planert Mfg. Co., 2256 W. Walnut St., Chicago; sleeves, clutch shoe	525
Republic Air Craft Division, Republic Aviation Corp., Detroit; hardened and ground precision parts mfg. plant	1,500,000
Samson United Corp., Rochester, N. Y.; electric fans	1,574
Sperry Gyroscope Co., Inc., Brooklyn; azimuth scales	15,615
Steel Storage File Co., 2216 W. 63rd St., Cleveland; file units	723
A. J. Ulmer, Irvington, N. J.; tool equipment	4,704
Wyman-Gordon Co., Harvey, Ill.; machinery and equipment for mfg. forgings	1,133,495

AWARDS

War Dept., Ordnance:

Alden Supply Co., Philadelphia; tools $2,837

Allegheny-Ludlum Steel Corp., Watervliet, N. Y.; rods, steel 225,595

Allen Electric & Equipment Co., Kalamazoo, Mich.; test stands .. 7,227

Allis-Chalmers Mfg. Co., La Porte, Ind.; artillery materiel 5,120,229

American Brass Co., Waterbury, Conn.; brass 56,876

American Car & Foundry Co., Berwick, Pa.; idlers 13,296
castings, alloy 1,389

American Steel & Wire Co., New Haven, Conn.; cables, steel ... 26,949

Associated Spring Corp., Wallace Barnes Co. Division, Bristol, Conn.; springs 1,689

Atlas Powder Co., Chattanooga Plant, Ooltewah, Tenn.; charges, spotting 823,362

Automatic Die & Products Co., Cleveland; fixtures 1,071

Baird Machine Co., Bridgeport, Conn.; tumblers 1,758

Baldwin Locomotive Works, Baldwin-Southwark Division, Philadelphia; machine, hydraulic testing 10,210

Barber-Colman Co., Machine & Small Tool Division, Rockford, Ill.; counterbores 2,155

Bausch & Lomb Optical Co., Contractor's Plant, Rochester, N. Y.; projectors 3,997

Borg-Warner Corp., Rockford Drilling Machine Division, Rockford, Ill.; clutches, transmission 59,301

Bossert Co., Utica, N. Y.; cases, cartridge 1,290,000

Boston & Maine Railroad, Boston; transportation 3,844

Braeburn Alloy Steel Corp., Braeburn, Pa.; steel, high carbon .. 8,557

Bridgeport Machines, Inc., Bridgeport, Conn.; machines, milling.. 1,075

Carpenter Steel Co., Reading, Pa.; rods, steel 51,935

Chase Brass & Copper Co., Inc., Chase Metal Works Plant, Waterville, Conn.; rod, brass 8,698

Christiansen, C. B., Newark, N. J.; pressers 3,470

Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati; grinders 4,905

Cincinnati Shaper Co., Cincinnati; shapers, horizontal 2,860

Circular Tool Co., Inc., Providence; saws, metal 3,150

Cleveland Twist Drill Co., Cleveland; drills 1,890

C. M. Co Mfg. Co., Long Island City, N. Y.; pins, fuze 7,276

Collins Electric Co., Inc., Springfield, Mass.; wire 2,101

Colt's Patent Fire Arms Mfg. Co., Hartford; feeders 16,575
small arms materiel 1,191

Continental Machines, Inc., Minneapolis; machines 1,551

Continental Steel Corp., Superior Sheet Steel Co. Division, Canton, Ohio; sheets, plate 59,200

Cummings Machine Works, Boston; fixtures 17,893

Despatch Oven Co., Minneapolis; Despatch furnace 7,719

Detroit Bevel Gear Co., Detroit; gears 47,528

Detroit Broach Co., Inc., Detroit; broach section details 1,198

R. E. Dietz Co., Syracuse, N. Y.; assemblies, head lamp 1,587

Edmos Products Corp., Brooklyn; staffs, cleaning 2,250

Enterprise Tool & Gear Corp., Detroit; gears 164,085

Exact Weight Scale Co., Columbus, Ohio; scales 8,873

Ex-Cell-O Corp., Continental Tool Works Division, Detroit; tools, cutting 3,595

QUALITY

BOLTS NUTS SCREWS

Continuously for 87 years we have been successfully making this one type of product. This experience is reflected in the product.

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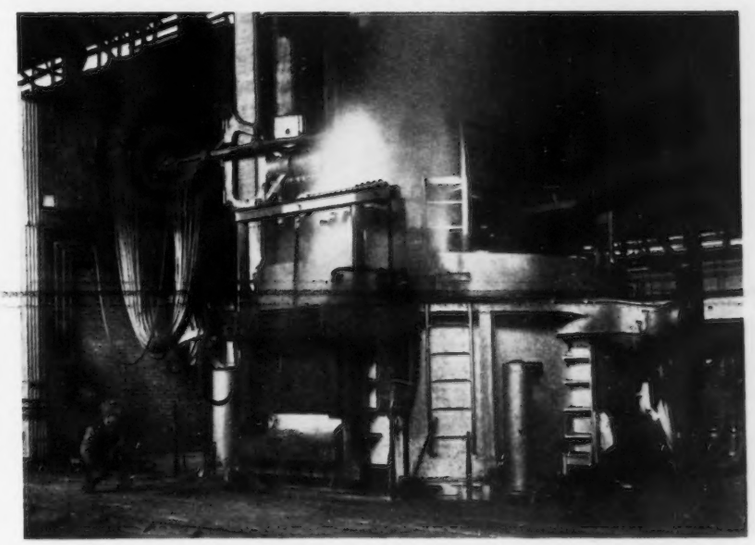

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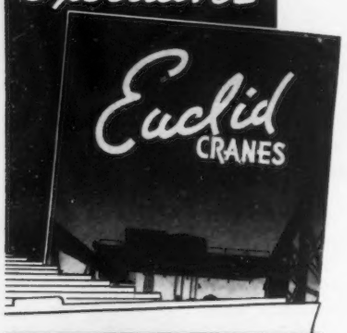
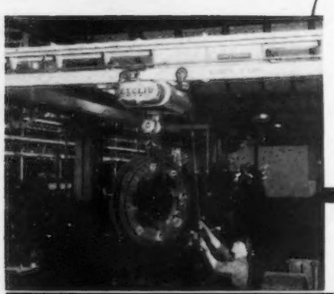
of all Production Executives





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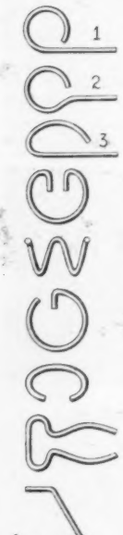

Watch your loops—Nos. 2 and 3 at left are generally less expensive than No. 1.

*

Much care should be used to select proper material—round, square or rolled wire.

*

In specifications, direction of action should be shown.

*

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Felt & Tarrant Mfg. Co., Chicago; comptometers 2,040
A. Finkl & Sons Co., Chicago; forgings 44,200
Firth-Sterling Steel Co., Philadelphia; steel, tool 1,463
Follansbee Steel Corp., Follansbee, W. Va.; sheets, plate 5,967
Gallmeyer & Livingston Co., Grand Rapids, Mich.; grinders 1,864
General Electric Supply Corp., Meriden, Conn.; fixtures, lighting 2,913
General Tool Sales Co., Philadelphia; tools 1,360
Goddard & Goddard Co., Inc., Detroit; cutters 2,912
Goepfert & Buck Co., New York; hardware 2,130
Greenerd Arbor Press Co., Nashua, N. H.; presses, hydraulic 1,396
Greenfield Tap & Die Corp., Greenfield, Mass.; taps, hand 6,394
Hanson Whitney Machine Co., Philadelphia; gages 1,050
Hobart Brothers Co., Troy, N. Y.; units, generating 2,491,320
Illinois Tool Works, Chicago; cutters 8,243
International Harvester Co., Chicago; adapters and parts 932,400
Irwin Auger Bit Co., Wilmington, Ohio; screw drivers 1,738
Johnson Brass Foundry, Roxbury, Mass.; castings 1,196
LaSalle Steel Co., Hammond, Ind.; steel, carbon 2,738
Leland - Gifford Co., Worcester; drill presses 1,665
Lisle Corp., Clarinda, Iowa; pipe plugs 1,000
Lohse Automotive Service, Rock Island, Ill.; parts, automotive equipment 3,790
McCrosky Tool Corp., Meadville, Pa.; bars, boring 1,376
Machinery Builders, Inc., Long Island City, N. Y.; tools 26,685
Mack Mfg. Co., Allentown, Pa.; pilot chassis 15,200
Merrill & Usher Co., Worcester, Mass.; iron, steel 1,065
Michigan Tool Co., Detroit; cutters 1,983
Modern - Bond Corp., Wilmington, Del.; friction discs 1,060
Morse Twist Drill & Machine Co., New Bedford, Mass.; taps, hand 1,120
W. B. Neill, Inc., New York; equipment rental 2,280
Niagara Machine & Tool Works, Buffalo; power folder and brake 1,574
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford; blocks, precision gage ... 1,250
gages, inspection 1,474
Norris Stamping & Mfg. Co., Los Angeles; cases, cartridge 690,000
Otis Steel Co., Cleveland; steel, structural 2,900
Precise Tool & Mfg. Co., Farmington, Mich.; gages and equipment 4,556
Putnam Tool Co., Detroit; bore reamers 3,120
Remington Arms Co., Inc., Bridgeport, Conn.; small arms materiel 3,212
Republic Steel Corp., Canton, Ohio; steel 2,121
Republic Steel Corp., Alloy Steel Division, Buffalo; steel 16,601
Revere Copper & Brass, Inc., Chicago; cases, cartridge 2,235,200
Rheem Mfg. Co., Chicago; bodies, bomb practice 3,051,657
Richards & Co., Madlen, Mass.; tin, phosphor 1,199
Joseph T. Ryerson & Son, Inc., Chicago; steel, carbon, strip ... 6,749
Scovill Mfg. Co., Waterbury, Conn.; artillery materiel 1,321
Service Caster & Truck Co., Albion, Mich.; trailers 1,480
Sperry Gyroscope Co., Brooklyn; adapters, assemblies, helmet ... 1,337

Standard Spring Co., Blood Brothers Machine Co. Division, Allegan, Mich.; hardware	7,555
Standard Tool Machine Co., Arlington, N. J.; fixtures, loading	3,049
Sterling Products Co., Moline, Ill.; screws, chucks, arbors	1,015
Thurston Mfg. Co., Providence; cutters	1,431
Timken-Detroit Axle Co., Detroit; assemblies	63,513
gears	4,334
Triumph Explosives, Inc., Elkton, Md.; assemblies	455,000
Tungsten Electric Co., Union City, N. J.; carbide blanks	38,250
United Shoe Machinery Co., Beverly, Mass.; dies	2,133
Universal-Cyclops Steel Corp., Bridgeville, Pa.; rods, steel	226,143
Vulcan Crucible Steel Co., Aliquippa, Pa.; steel, tool	1,226
Washburn Co., New York Division, New York; wire	1,012
Watson-Stillman Co., Roselle, N. J.; presses, hydraulic	3,150
Wayne Pump Co., Fort Wayne, Ind.; artillery materiel	7,560
Weinstein, S., Supply Co., New York; hardware	1,340
Wiedeman Machine Co., Philadelphia; gages	13,366
Worcester Taper Pin Co., Worcester; holders, fuze	36,300
Worthington Pump & Machinery Corp., Holyoke, Mass.; artillery materiel	4,718,400
Wright Machine Co., Worcester; adapters and plugs	11,771
York Safe & Lock Co., York, Pa.; artillery materiel	2,969,476
Youngstown Steel & Tube Co., Youngstown, Ohio; steel, plate	1,484
Zimmerman Steel Co., Bettendorf, Iowa; steel castings	2,161

Harvester Pays Bonus

Chicago

• • • **A $1,384,047 bonus pie** was divided among employees of the International Harvester Co. because of good business in 1940. The distribution was equivalent to 2.1 per cent of 1940 wages.

Canton Seeks "All Out" Defense Tool Data

Canton, Ohio

• • • **Canton has taken** literally the Office of Production Management's request for "all out" information concerning defense production facilities. The aggressive drive to get all local machines into the national program entered a new phase last week when the Chamber of Commerce added a full-time inspector who will collect comprehensive data through plant visits, augmenting a questionnaire survey completed recently.

So thorough will the chamber's survey be that each individual machine will have a card all its own in the organization's files. Cross-indexes will be made for quick reference, and duplicate data will be supplied government procurement offices and the new Cleveland defense office of the fourth Federal Reserve district.

A. B. Clay, the new inspector, will work under the supervision of the chamber's sub-committee of production engineers. He will make daily reports. In addition, he will explore local defense training possibilities.

On the card for each machine will be its complete biography. Age, condition, type, specifications, capacity and hours of present service per week will be listed. At the same time information will be secured on shop floor space, both that in use and not in use; light, heat, power, shipping facilities, technical staff, personnel, and products manufactured.

The original survey provided valuable information which was used almost daily, but within three months the sub-committee of engineers became convinced "all out" information was vital.

When Mr. Clay finds an important machine only working 40 hr. per week, he will go into detail as to why it isn't doing a bigger job for the defense program. In fact, in the short time since his appointment, he has uncovered several reasons. It may be due to lack of skilled workers to keep it busy a second and third shift. It may still be idle for lack of orders, because defense work is still far from being distributed evenly. And it may be idle because, for lack of a single part needed for final assembly, it has to wait for the arrival of that part.

The Canton Chamber of Commerce is urgently suggesting to everyone in authority more and more speed in the "farming out" process. There are several important reasons on behalf of all small concerns, for the chamber's insistence. Some highly important machines even today are motionless because the spreading of orders is only beginning.

Canton's industrial employment was up 26 per cent in 1940, and it is conservatively estimated that 8000 persons will be added during the next 24 months, most of the

CANTON SUB-COMMITTEE on defense production. Left to right—G. F. Malick, director of Timken Vocational High School; John Quinn, manager, United Engineering & Foundry Co. and chairman of the Chamber's national defense committee; John E. Raber, production manager, Diebold Safe & Lock Co.; H. D. Buker, assistant to the superintendent, Timken Roller Bearing Co., and chairman of the sub-committee; E. C. Schmidt, assistant production manager, Hoover Co.; Edward Poyser, tool designer, Berger Mfg. Co.; A. B. Clay, newly added to the Chamber staff as inspector.

gain to be caused by the new Naval ordnance plant and the operations of the Hoover Co., which holds direct awards. The Naval ordnance plant will cost around $16,000,000 with equipment.

Although new home construction showed a gain of 69 per cent last year, it is expected that 1000 to 1400 new homes will be built here in 1941. Work on 300 defense rental homes is to start soon.

In the current inspection, the chamber is also locating machines that can be used for defense training. Information concerning them is turned over to G. F. Malick, director of the Timken Vocational High School and a member of the subcommittee. The new $1,250,000 institution, of which he is director, has defense training classes in session 24 hr. a day, and Mr. Malick is now developing courses within industry itself. The Timken school was the gift, to the school children of Canton, of the late H. H. Timken, nationally known Canton industrialist and benefactor.

While he's at it, Mr. Clay checks on floor space not in use, available ground area for plant expansion possiblities, and data on tolerances to which the plant and its employees are accustomed. Back of Mr. Clay is a wealth of defense information in the active files of the Canton Chamber of Commerce, which has had its name placed on every government mailing list that has anything to do with national defense. Supplementing that, the chamber recently invited the Cleveland procurement office of the Army to use chamber headquarters as a branch office. The invitation was accepted, and the branch office, with an Army lieutenant in charge, is established. It has, of necessity, a private office and a private telephone line.

To show the quality of the committee on production facilities, the names and titles of that group are presented as follows: Chairman, H. D. Buker, assistant to the superintendent, Timken Roller Bearing Co.; Edward Poyser, tool designer, Berger Mfg. Co.; E. C. Schmidt, assistant production manager, the Hoover Co.; and John E. Raber, production manager, Diebold Safe & Lock Co.

The general committee is headed by John Quinn, manager, United Engineering & Foundry Co. Members of his group are: L. S. Hamaker, Berger Mfg. Co.; H. C. Weible, Diebold Safe & Lock Co.; B. T. Bonnot, the Bonnot Co.; J. F. Hattersley, the Hoover Co.; Walter C. Sanders, Timken; H. D. Dilmore, Canton Metal Decorating Co.; Darwin S. Luntz, Luntz Iron & Steel Co.; Charles L. Bowman, Bowdil Co.; W. R. Harrison, Spun Steel Corp.; W. A. Porterfield, Union Metal Mfg. Co.; John Buchman, Jr., Frankham Brass & Bronze Co.; G. F. Malick of the vocational high school; Roger B. Kelly, Canton Development Corp., and H. D. Buker.

Mr. Bonnot is the author of the widely discussed divisional clearing agency system for sub-contracting, whereby production bottlenecks would be summarized for study by plants seeking to aid in the defense program. This "deck clearing" system provides stated time limits and appropriate steps for dealing with emergency problems.

Dallas L. Hostetler, manager of the Canton Chamber of Commerce, states that at least 90 per cent of all current chamber activities relate to national defense in one respect or another.

"New jobs developing daily for us include such matters as street and highway improvement, water supply, military affairs and transportation facilities, all directly pertaining to that part of the rearmament program which Canton has been assigned to handle," he said.

Canada Plans To Build Destroyers

Ottawa

• • • **C. D. Howe, Minister** of Munitions and Supply, announced that steps are being taken to build destroyers in Canadian shipyards. "We have obtained our detail sheets, our plate specifications are here and our plate sizes are here," he said. "We have explored the equipment market and know where to place orders for equipment. We have been able to obtain a few experienced men from England, though the British Government was reluctant to spare them."

The Minister of Munitions and Supply also announced further expansion in Canada's shipbuilding activities. Since the first of the year Canadian shipyards on the St. Lawrence and Pacific coast have received contracts for 20 merchant vessels for Great Britain, a number which is to be more than doubled. The ships are to be of the 9500-ton merchantmen type. Mr. Howe also stated that contracts have just been awarded for 10 more corvettes. These new orders bring to 80 the number of corvettes built and to be constructed in Canadian shipyards.

Mr. Howe announced that for the week ending March 7, the Department of Munitions and Supply placed 1721 contracts, with total value of $16,379,020. Contracts include:

Capital expenditure — Canadian Acme Screw & Gear Co., Ltd., Toronto, $403,356; De Havilland Aircraft of Canada, Ltd., Toronto, $136,239; Canadian Westinghouse Co., Ltd., Hamilton, $6,270,417; B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, $30,109.

Munitions—Eureka Planter Co., Ltd., Woodstock, $25,637.

Ordnance — British War Office, England, $162,200; Dominion Engineering Co., Lachine, Que., $2,049,600; Canada Cycle & Motor Co., Ltd., Weston, $363,792.

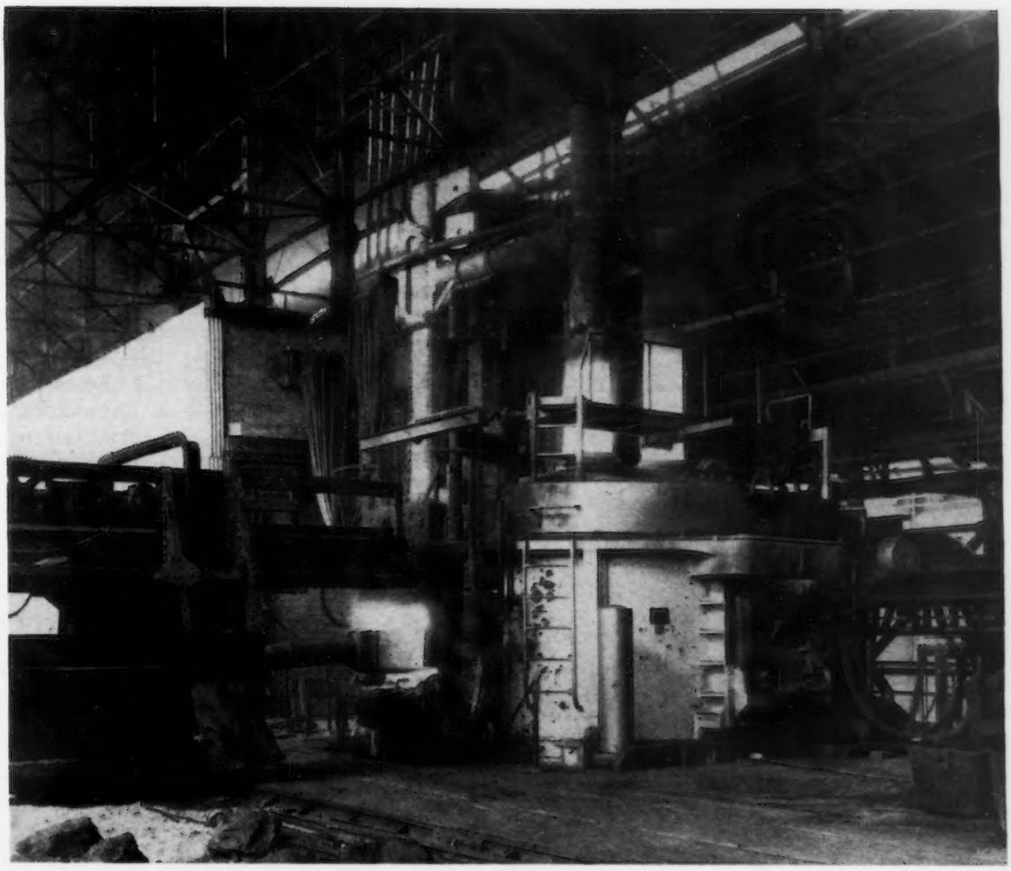
Aircraft—British Air Ministry, England, $35,400; Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Que., $23,530; Standard Machine Works, Winnipeg, Man., $46,008.

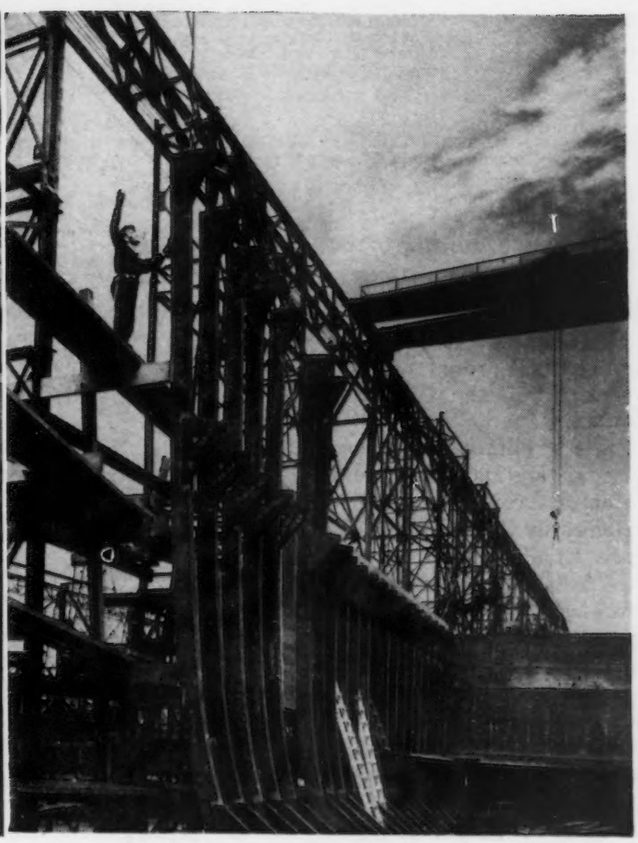
Mechanical transport — Dennisteel Corp., Ottawa, $29,972; General Supply Co. of Canada, Ltd., Ottawa, $23,276; Metallic Roofing Co. of Canada, Ltd., Ottawa, $29,302; Brantford Coach & Body Co., Ltd., Brantford, $152,819; Eastern Steel Products Co., Ltd., Stratford, $57,914; Canadian Top & Body Co., Ltd., Tilbury, Ont., $63,945.

Instruments (technical)—Canadian General Electric Co., Ltd., Ottawa, $248,968; Instruments Limited, Ottawa, $66,805; Ontario Hughes-Owens Co., Ltd., Ottawa, $198,067; Stanley Mfg. Co., Toronto, $26,672.

Shipbuilding — Halifax Shipyards, Ltd., Halifax, N. S., $131,670; Dufferin Shipbuilding Co., Ltd., Toronto, $1,290,557.

BETHLEHEM AND U. S. DEFENSE: More than $1,300,000,000 in defense orders have gone to Bethlehem Steel Co. largely because of its (1) great shipbuilding capacity and (2) its equipment and skill for making forged steel products. At the right is a new 50-ton electric furnace recently installed. Below, left, is a mold loft floor where wooden templates to guide the steel fabricators are made from a full size layout of a ship's hull. The other photo shows a cargo ship hull taking form as the frames are erected.





January Steel Exports Decline to 698,853 Tons

IMPORTS January			EXPORTS January	
1941	1940		1941	1940
....	1,914	Pig iron	80,322	15,057
....	2,023	Ferromanganese and Spiegeleisen[1]	352	408
41	269	Ferrochrome and ferrosilicon[1]	2,691	....
....	50	Other ferroalloys[1]	703	747
23	12	Sponge iron	*	....
17	442	Scrap: iron, steel, tin plate	45,055	187,457
81	*4,710*	*Pig iron, ferroalloys and scrap*	*129,123*	*203,669*
....	204	Ingots, blooms, billets, sheet bars	201,883	58,194
*	....	Ingots, etc.: stainless, other alloy	55,191	2,608
*	....	Skelp	11,028	8,535
....	1,037	Wire rods	10,855	9,295
....	*1,241*	*Semi-finished steel*	*278,957*	*78,632*
1	8	Sheets, black iron and steel[2]	37,378	33,063
*	....	Sheets, galvanized iron and steel	6,068	16,985
*	....	Sheets, alloy steel	535	562
*	....	Sheets, stainless	50	241
1	1	Plates, plain and fabricated	52,413	24,065
*	....	Plates, alloy	184	173
*	....	Plates, stainless	89	4
19	400	Bars, merchant and reinforcing	41,921	44,882
....	85	Bars, iron[3]	120	1,449
*	....	Bars, alloy steel	7,147	* 1,600
*	....	Bars, stainless	49	80
14	189	Bars, hollow steel	*	....
....	305	Hoops, bands, strips, cotton ties	18,053	18,096
*	....	Hoops, bands, strip: alloy steel	26	75
*	....	Hoops, bands, strip: stainless	63	100
*	....	Structural shapes	461	1,971
....	216	Piling, sheet	37,752	14,529
19	....	Structural material, fabricated[4]	4,632	7,054
21	3	Tin plate, terne plate, taggers' tin	10,104	64,928
*	....	Tanks, steel	3,914	1,957
*	....	Pipe, welded iron and steel	8,005	8,736
2	412	Casing and oil line pipe	4,461	19,021
*	....	Boiler tubes	4,682	1,759
3	200	Wire, round iron and steel, telephone	3,212	6,621
34	81	Wire rope, strand, other products	1,774	850
*	....	Wire barbed, woven products	2,408	3,099
185	230	Wire flat, all other types	5,817	9,709
4	38	Nails, tacks and staples	434	523
2	5	Bolts, nuts, rivets, washers, etc.	3,377	1,081
....	109	Rails and track material	19,736	7,451
*	....	Die blocks or blanks, etc.	*	....
....	3	All other finished steel	7,718	2,692
305	*2,285*	*Rolled and finished steel*	*282,583*	*294,356*
*	....	Cast iron pipe and fittings	2,595	3,036
*	....	Malleable iron pipe fittings	542	498
37	38	Castings, forgings: iron and steel	3,126	2,884
*	....	Castings, forgings: alloy and stainless	868	487
*	....	Carwheels and axles	1,059	959
37	*38*	*Castings and forgings*	*8,190*	*7,865*
423	8,274	Total	698,853	583,521

[1] In imports the tonnage shown is the alloy content—the manganese, chromium, and silicon content, as the case may be. [2] Imports include skelp and saw plate. [3] Import figures include iron slabs. [4] Imports include sashes and frames only.
* No separate figures.

Iron and Steel Imports Reach New Low Point

• • • **Totaling only** 406 gross tons valued at $157,284, imports of iron and steel products (other than scrap) into the United States in January set a new low for this trade, preliminary figures released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce reveal. The previous low record for this trade —728 tons valued at $165,009— was set in November, 1940, while receipts in December had amounted to 4016 tons valued at $206,825. A year ago—in January, 1940—this trade amounted to 7832 tons valued at $920,533. The 184 tons of flat wire and strip steel imported from Sweden was the feature of the January, 1941, trade.

IMPORTS—JANUARY, 1941
(Gross Tons)

Pig Iron—None

Iron Ore—154,503

Canada	6,283
Cuba	11,400
Brazil	5,020
Chile	131,800

Manganese Ore (35% & over) 44,819
Battery Grade—3227

India	30
Union of S. Africa	1,857
Other British S. Africa	1,340

Other—41,592

Russia	1,857
Cuba	3,779
Brazil	13,600
India	9,724
Netherland Indies	146
Philippine Islands	4,384
Union of S. Africa	18
Gold Coast	8,046
Morocco	387

Reynolds Metals Signs Second Bonneville Contract

• • • **Reynolds Metals Co.** last week signed a second contract with the Bonneville Power Administration for delivery of an additional 20,000 kw. of Bonneville-Grand Coulee power to a Reynolds plant to be located somewhere on the Administration's power transmission system.

The new 20-yr. contract is in addition to one signed by Administrator Paul J. Raver with the Reynolds Co. Feb. 24 under which the Power Administration agreed to deliver 40,000 kw. for aluminum manufacture by June 15, 1941. The new contract steps up the amount of Bonneville-Grand Coulee power to go to the Reynolds company to a total of 60,000 kw. and will increase the total capacity of the company to 60,000,000 lb. of aluminum annually. Deliveries of power under the agreement start Oct. 15.

The Reynolds contract brings the total power commitment of the Bonneville Power Administration, which is administering power sales for both Bonneville and Grand Coulee dam, to 278,452 kw.

Welding Group To Hear Spicer

• • • **"Welding Monel,** Nickel and Inconel in Solid and Clad Plate Constructions" will be the subject of a talk which K. M. Spicer, of International Nickel Co.'s development and research division, will give at the regular meeting of the northern New Jersey section of the American Welding Society on Tuesday evening, March 18, in the Oxford room of the Essex House, 1050 Broad St., Newark, N. J.

$5,000,000 Gun Mount Order For Allis-Chalmers

La Porte, Ind.

• • • **Allis-Chalmers Mfg. Co.** plant here has received a war department contract for more than $5,000,000. The contract calls for construction of mounts for 90 mm. anti-aircraft guns. Production is expected to be under way this summer.

Stettinius Order To Speed Priorities

Washington

• • • **Reducing the informal** working arrangement between the Army and Navy Munitions Board and officials of the OPM Priorities Division to a formal plan for operation of the priorities system, Director of Priorities E. R. Stettinius, Jr., on Tuesday made public his first administrative order. Broader and faster application of the priorities system is seen in the order. It provides formal authorization for the handling of priorities of the Army and Navy and validates previous priorities orders. The priorities critical list, never before made public, was announced and sets forth all items on which the Army and Navy field services can automatically assign priority ratings. Included in the order also are official instructions from the War and Navy Departments to their supply, arms services, bureaus and offices, together with a revised circular bringing up to date the description of the priorities system in operation.

Prominent among the changes made in the formal plan is that the Army and Navy Board will administer the assignment of preference ratings to army and navy orders not only for prime contracts and first subcontractors but also all other subcontracts for critical list items.

A number of new items have been added to this list, including those recently subjected to industry-wide mandatory priorities, such as aluminum, magnesium, neoprene and nickel. Among items which appear for the first time in the new edition of the priorities critical list are armor plate, boilers, bull-dozers, diamond point tools, floating drydocks, power driven hammers, power or hand hoists, diesel, gasoline and electric locomotives, blasting machines, ship plates, and electric furnace, bullet, armor plate, tungsten, nickel, chrome and vanadium steel.

Allocation of these products by the Priorities Division will take precedence over ratings assigned by the Army and Navy when shortages are so acute as to make necessary a diminution of quantities flowing to military channels. The division will continue to handle directly the assignment of ratings for items not on the critical list for important civilian projects. Under the revised system are numerous provision of interest. Among them are the following:

The Army and Navy Board will assign ratings to prime contracts of certain foreign governments including Great Britain and Canada and provision is made for extension of these ratings to subcontracts.

Only an official preference rating certificate will be binding, but manufacturers will be encouraged to inform subcontractors and suppliers regarding what ratings may be extended to their work if a priority certificate is requested and issued.

A completely new set of forms will be issued in operating the priorities system but previously issued certificates and extensions will remain valid.

In special instances the priorities division is prepared to grant authority for the automatic use of limited blanket ratings which will be valid for a limited period only.

The Priorities Division will continue to see to it that civilian needs are carefully balanced with defense needs at all times.

The preference rating certificate will continue to be the principle administrative mechanism in the operation of the system.

The priorities critical list will be subject to revision once a month.

Steel Wage Meeting Slated For March 20

Pittsburgh

• • • Officials of the SWOC and Carnegie-Illinois Steel Corp., were to have begun negotiations Thursday, March 20. (The union's demands were listed in THE IRON AGE last week, the major point being a 10c. an hour wage increase demand.)

If no agreement is reached within 20 days of date of notification the contract becomes void. However, there is a possibility that the conferees may find some way to extend the discussions beyond the contract deadline—April 1—in case a deadlock exists at that time.

Quick Training Needed Now, Knudsen Says

Washington

• • • **OPM Director General** William S. Knudsen told 75 industrialists and labor leaders early this week that in attaining a rate of production never reached before all thought of a 4-yr. apprentice training program will have to be abandoned and efforts concentrated on a quick job. He emphasized that the best kind of training a man gets is in the shop—the kind of training that is "going to do you and me the most good."

Conferees also heard Associate Director General Sidney Hillman, who was introduced by Mr. Knudsen as "my Siamese twin," stress the importance of labor supply for the defense program.

Discussed at the session were questions as to whether industrial plants can continue production at an increasing rate and at the same time train workers necessary to assure an ample reservoir of labor in the future; whether financial incentive is necessary to plants training new workers; and whether there should be included in government defense contracts a clause making the introduction of apprentice training courses mandatory.

In advancing the latter proposal, Secretary of Labor Frances Perkins said it was one of the methods being suggested for injecting new life in the apprenticeship programs to meet defense requirements. She called it worthy of consideration along with the other subjects up for discussion.

Much of the testimony centered around figures supplied by A. F. Hinrichs, Acting Commissioner of Labor Statistics, who estimated that the total number of apprentices employed at present does not exceed 125,000—a figure which he said is far below minimum needs for all-round training program. It was his estimate that the number should be at least ten times greater —perhaps as high as 1,500,000.

Number of approved apprentice systems meeting Labor Department standards advanced from 578 in August last year to approximately 800 at the end of February, 1941.

Ingalls Iron Works Strike Threats Ended

Birmingham

• • • **Strike threats by more** than 600 American Federation of Labor structural steel workers at plants here of Ingalls Iron Works Co. ended March 13 with the signing of a new contract which provides a minimum of 45c an hour for helpers and a 6 per cent pay increase for employees in classifications above that of helper, Virgil C. Finch, commissioner of conciliation, U. S. Department of Labor, announced.

Four Join Steel Unit of Production Division

Washington

• • • **Duties of four men** who recently have joined the staff of the steel unit of the OPM Production Division have been outlined.

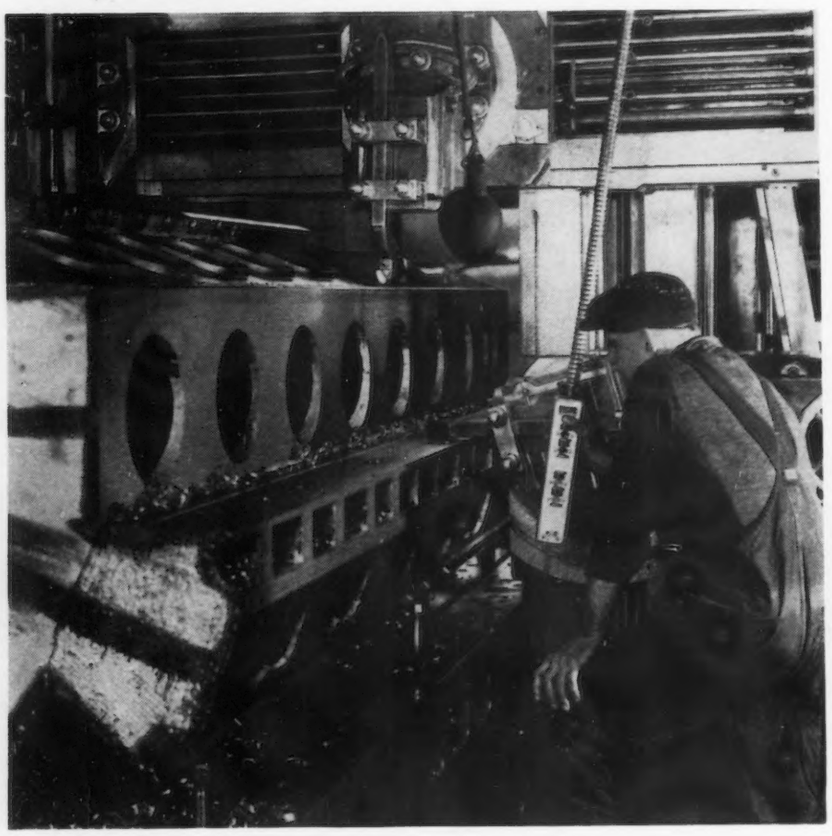
George F. Hocker, Bethlehem, Pa., manager of heavy forgings and castings sales for Bethlehem Steel Co., will assist in a resurvey of the heavy forging situation, begun late in January to determine whether the initial expansion of the heavy forgings industry would be sufficient to meet all defense demands. Heavy forgings are used extensively in shipbuilding and ordnance manufacture.

Arthur A. Wagner, Pittsburgh, in charge of sales of plates and structural material for the Jones & Laughlin Steel Corp., will deal with these products and special steels.

Arthur J. O'Leary, Coatesville, Pa., assistant to the manager of steel plate sales for the Lukens Steel Co., will assist in expediting urgently needed steel deliveries.

James G. West, Pittsburgh, formerly in charge of blast furnaces for Jones & Laughlin, will visit closed blast furnaces in various parts of the country to determine whether they might be rehabilitated to increase pig iron production. The OPM said that a number of old and obsolete furnaces are now closed down.

DIESEL ENGINE in the making: With intensification of the defense program, the General Motors Corp. Cleveland diesel engine division plant has converted almost all its production to propulsion machinery for the U. S. fleet. Above, workman Charles Smith planes a 16-cylinder diesel motor crankcase.



U. S. Mines Mills Produce 1,386,000 Lb. of Copper in '40

Washington

• • • **Mines and mills** in the United States producing ores and concentrates valued chiefly for their copper content had an output valued at $142,000,000 at the points of production and the products contained about 1,386,000 lb. of recoverable copper, according to preliminary figures for 1939 released by Dr. Vergil D. Reed, Acting Director of the Census.

It is estimated that these mines and mills accounted for 95 per cent of the recoverable copper contained in all ores and concentrates produced in the United States. The remaining 5 per cent represents largely by-product copper from operations engaged in producing ores valued chiefly for metals other than copper.

The ores and concentrates produced by copper mines and mills in 1939 contained, in addition to copper, the following quantities of recoverable metals: 429,496 ounces of gold, 13,138,000 ounces of silver, 7,425,000 pounds of molybdenum, 52,841,000 pounds of zinc, and 14,432,000 pounds of lead. Of these metals, copper, molybdenum, zinc, and lead are essential materials for national defense, and recent proclamations by the President have placed the first three on the list of commodities that cannot be exported without government licenses. Chief military uses of copper are for electrical, communication, and transport equipment, and for ammunition.

The total quantity of recoverable copper in ores and concentrates produced by copper mines and mills in 1939 was 28 per cent below that of 1929. About 43 per cent of the 1939 output came from five open-cut operations and 57 per cent from 44 underground mines. Arizona was the leading copper-mining state, accounting for 36 per cent of the copper mine and mill output of recoverable copper. Utah produced 24 per cent; Montana, 14 per cent; Nevada, about 10 per cent; New Mexico, 7 per cent; Michigan, over 6 per cent; and all other states, less than 4 per cent.

Steel Output Tops Consumption, Study Of Inventories Shows

By T. C. CAMPBELL
Pittsburgh Editor, The Iron Age

• • • **With the exception** of three months early in 1940, when ingot output dipped, steel production has consistently outstripped actual consumption since July, 1939, according to comprehensive and reliable studies on the inventory situation.

From indications it is believed that consumption of steel continues below actual production, hence a further increase in physical steel inventories has materialized.

Steel inventories are considered to be plain steel, products in stock, steel in the process of fabrication and finished products made from steel. In view of the current discussion on the inventory situation and the not too distant painful experience of 1938 and part of 1939 when steel consumers "lived off inventories," steel makers and steel consumers are expected to watch inventory trends closely in the future. Especially is this true with the steel industry operating close to 100 per cent of rated capacity.

It is admitted that while steel consumers as a group are actually adding to their inventory either by way of stocks, material in process or finished products, there is some maldistribution from average figures. In other words, the deviation from the average is not uniform in some instances. Some companies appear to have less inventory than would be indicated by the overall steel consumer inventory data.

A striking conclusion on the latest information available indicates that the steel inventory situation has not yet reached a "dangerous" state. It is believed that the total steel inventories in the hands of consumers at the beginning of this month were still less than the high point reached in 1937. On the other hand, the rapid acceleration in steel production, although accompanied by increasing consumption, might subsequently cause inventories to match or to surpass the high point reached in 1937. It is further conceded, however, that physical stocks of steel inventory on hand are, from a standpoint relative to consumer industry operations, of less magnitude than they would be were the operating rate at a lower level.

While it is reasonable to expect steel consumers to establish a higher normal inventory because of the increased tempo in business conditions, there is already reasonable evidence that steel consumers as a whole are attempting, and with some success, to build inventories to a higher level than would be considered normal even under present high consuming industry operating rates.

Concern in high places among steel makers springs from the fear of the tremendous price the steel industry must pay when and if consumption falls off, thus making inventories relatively larger than they now appear.

It is logically concluded that, despite reports to the contrary, steel consumers as a whole are not only replacing material used up but are replacing it at a faster rate than actual consumption is taking place. It is agreed that in some isolated spots this general observation does not apply. However, it is believed that unless proper inventory control is exercised, a period of inventory assimilation which inevitably follows a turndown in consumption will be reflected very drastically in the nation's steel operating rates. The mere fact that it is not known when the drop in consumption will occur, hence the relatively greater increase in inventory, is by no means material to the consequences which will follow.

Chicago Industry To Study "Labor Pirating"

Chicago

• • • Problems of "labor pirating" will be studied by a committee appointed by the Employers' Association of Chicago. Charles S. Craigmile, general manager and vice-president, Belden Mfg. Co. is chairman of the committee which has this five-point program: (1) Publicize evils which result for employees and employers alike if competitive bidding for labor is not voluntarily abolished; (2) Urge industrialists to set up training programs; (3) Encourage cooperation between companies and legitimate agencies—both government and private—now endeavoring to provide labor training; (4) Ask employers of skilled labor to report flagrant cases of "pirating"; (5) Urge labor unions to ease restrictions on number of apprentices allowed in proportion to skilled workers in certain industries and for the unions to expand their own training programs through union-run trade schools.

Aluminum To Be Rationed Among Civilian Consumers

Washington

• • • **An OPM survey** showing that all new aluminum produced during March will be required for the manufacture of defense items prompted the Priorities Division this week to devise a rationing formula by which the diminishing supply for civilian use may be spread among manufacturers of automobiles, refrigerators, cooking utensils and other non-defense products.

Officials estimated that makers of aluminum products for civilian use would have to take cuts in the raw material supply ranging from 25 to 75 per cent, depending upon the exact nature of the articles manufactured by individual concerns. The steel industry consumes about 33,000 tons of aluminum annually, of which about 30,000 tons is used for de-oxidation purposes and 3000 tons in the production of nitraloy.

Mandatory priorities were invoked for aluminum on Feb. 28, thereby giving preference to defense production, but subsequent analysis of the aluminum picture indicated that during March defense requirements will completely exhaust supplies of new aluminum. Available supplies of scrap and secondary aluminum which could be diverted to civilian uses are estimated at from 10,000,000 to 14,000,000 lbs. but there is an ordinary demand for aluminum of 32,000,000 to 33,000,000 lbs. a month.

Strikes Check Output At Pittsburgh Plant

Pittsburgh

• • • **Sporadic dues** collection and membership drives of the CIO and the continuation of two strikes, one involving 1400 employees at the Universal Cyclops plant, Bridgeville, Pa., and the other a 5-week shutdown at the Bridgeville plant of the Vanadium Corp. of America, continued to hamper national defense production here last week.

Universal Cyclops strikers volunteered their services last week to move finished material out of the mill for defense purposes. CIO strikers at the Vanadium corporation plant late last week refused a request of Sidney Hillman, OPM official, to assist in moving out of the works supplies of ferro-vanadium and vanadium oxide used in the manufacture of tool steel urgently needed by defense industries. Foremen and other white collared workers loaded the material Sunday while 35 Pennsylvania motor policemen furnished protection against any possible interference from the pickets.

American Bridge Co., large fabricating subsidiary of the U. S. Steel Corp., was hampered in its operations last Thursday, Friday and Saturday owing to an SWOC dues and membership demonstration. The plant holds substantial fabricated steel orders for national defense buildings.

Steel Scrap Composite Has Seldom Gone Above $20

• • • **The question whether** a price of $20, Pittsburgh, for No. 1 heavy melting steel scrap is sufficiently high to bring out the required amount of scrap to supply the steel plants of the country at their present high rates of production has been frequently raised of late.

It may have escaped the attention of some observers of scrap price trends that rarely have steel scrap prices been in the zone above $20.

The period of greatest inflation in scrap prices was 1917 and 1918. In 1917 the yearly average of THE IRON AGE steel scrap composite price was $28.35 and in 1918 it was $28.76. The highest monthly average during that period was $37.21 in June, 1917. But steel prices, as measured by THE IRON AGE finished steel composite, were about 85 per cent higher in 1917 than present prices and were almost 57 per cent higher in 1918.

In 1920, a period of price inflation, THE IRON AGE scrap composite was $20 or higher in every month except one. The average for the year was $23.71. The peak month was September, with an average of $26.53.

After the business decline at the end of 1920 the scrap composite price did not again rise above $20 until 1923. During the first five months of that year it was above $20, but the year's average was $19.05. In December, 1924, and January, 1925, the composite rose a little above $20, but it did not attain that level again (not even in the boom of 1929) until 1937, when for three months it went over $20. The March average in that year was $21.25; April, $21.02 and August, $20.43.

From then on the composite did not rise above $20 until after the outbreak of war in Europe. When the war broke out the composite was $15.62. By the last week of September it had risen to $21.67 and in the first week of October to $22.50, which is the recent peak.

Last week's composite price of $20.33 was $5.42 above the average for the period 1919-1940. That 22-year average was $14.91.

11-Man Board To Mediate Strikes

Washington

• • • **The President's warning this week against unnecessary strikes was made in the midst of preparations to set up by executive order an 11-man defense mediation board, made up of three representatives of the Government, four of management and two each of the American Federation of Labor and the Congress of Industrial Organizations.**

Tool Price Schedule Reporting Is Revised

Washington

• • • **Changes in the** methods by which tool dealers report their sales, purchases and inventories under the second-hand machine tool price schedule issued last month by the Price Stabilization Division will permit the compilation of a catalog of all used machine tools available for sale.

The revision also will make available information necessary in policing prices.

Effective March 15, this revision was made to the original machine tool price schedule and incorporated in new forms now being distributed.

1. Instead of reporting weekly inventory and monthly sales to the division of price stabilization, dealers need report each tool in his possession only once—either now as part of his inventory, or when he buys it. If he sells it, the sale, of course, must continue to be reported.

2. Hereafter all floor type machines—even though they sell for less than $500—must be included in reports to the division.

3. Dealers have been asked to attach a picture of each tool to the report whenever possible.

Lake Superior Iron Ore Stocks Lower On March 1

Cleveland

• • • **Stocks of Lake Superior** iron ore on hand at furnaces and Lake Erie docks March 1 totaled only 24,195,165 gross tons, according to the latest report of the Lake Superior Iron Ore Association here. This compares with 29,794,047 tons on Feb. 1 and 25,966,874 tons on March 1, 1940.

February consumption was 5,673,166 tons by the furnaces using Lake Superior ore, a decline of about 700,000 tons from the amount used in the longer month of January. At the end of February the association listed 164 stacks in blast out of the 186 depending principally on Lake Superior ore. This represented a decline of three stacks from the previous report.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **D. C. Gaskin** has been named vice-president and general manager of the Studebaker Corp. of Canada, Ltd. Mr. Gaskin's promotion to leadership of Studebaker operations in Canada follows the transfer of **M. S. Brooks** to an executive position at Studebaker's South Bend plant.

• **H. Herbert Hughes** of Washington has been appointed to the staff of the Automobile Manufacturers Association. Mr. Hughes was formerly chief economist of the Mineral Production and Economics division of the Bureau of Mines. During the past four years he supervised compilation of "Minerals Year Book," the bureau's annual publication on statistics and economic aspects of all branches of the mineral industry. He will be attached to the Washington office of the association, assigned for the present to activities related to the defense program.

• **George S. Dively,** assistant treasurer of Harris-Seybold-Potter Co., Cleveland, has been elected treasurer.

• **James K. Owen,** former assistant manager of sales at Cleveland for the past 14 years, has been appointed district manager of the new sales offices of Sharon Steel Corp. at 425 Chamber of Commerce Building, Indianapolis, with **George S. Warren, Jr.,** assistant manager.

• **Herman H. Lind** has been appointed district manager for the new Defense Contract Service of the fourth Federal Reserve district, according to an announcement by George C. Brainard, coordinator of the service. Mr. Lind is secretary of the American Institute of Bolt, Nut and Rivet Manufacturers.

• **Courtland Hill** has been appointed plant engineer of Webster Mfg., Inc., Tiffin, Ohio, according to announcement by John B. Nordholt, president.

JAMES K. OWEN, Indianapolis district manager of the Sharon Steel Corp., Sharon, Pa.

• **J. L. Koubek** has been appointed sales manager of the Guide Lamp division of General Motors Corp. At the same time, appointment of two assistants, **John Hugel** and **S. R. Conwell,** was announced. Koubek has been with General Motors since 1929 and for the past several years has been with the Guide Lamp division's sales engineering staff. For the last two years he has been in charge of the Detroit office of Guide Lamp. Hugel and Conwell, who have been with General Motors for many years, will head sales offices, Hugel at the main plant in Anderson, Ind., and Conwell in Detroit.

• **Robert L. Reed,** president of the Robert L. Reed Co., Detroit, has been elected president of the Plating and Rustproofing Association of America in Detroit. Other officers are **Charles Erdman,** of Central Plating Co., vice president, and **Frederick R. Bolton,** secretary-treasurer. Members of the board are **H. E. Adelsperger,** Auto City Plating Co., **Mr. Erdman; Paul E. Henning,** Detroit Plating Industries; **W. B. Knight,** Knight Plating Co.; **Reed,** and **Percy L. Stapleton,** Service Plating Co.

• **H. W. Mons,** vice-president of Hill-Clarke Machinery Co., Chicago, has completed 40 years of consecutive service with the company. A small party was held in honor of the event.

• **Robert S. Drummond,** Detroit, president of the National Broach Machinery Co., gave an address on the subject, "Modern Gear Practice—An Aid to National Defense," before the Milwaukee branch of the American Society of Tool Engineers at its recent meeting.

• **James M. White,** former manager of the La Porte works of the Allis-Chalmers Mfg. Co., Milwaukee, has been appointed assistant general works manager of the company. Mr. White was graduated from the Alabama Polytechnical Institute with a degree in mechanical engineering. In 1929 he joined the Allis-Chalmers company and entered its graduate student engineering course, serving his apprenticeship in the West Allis works. On completing this

JAMES M. WHITE, assistant general works manager of the Allis Chalmers Mfg. Co., Milwaukee.

course, he worked in various departments of the shop and in the field. In 1935 he was appointed to the position he is now vacating.

• **Robert M. Derby,** former vice-president in charge of foreign business of the Niles-Bement-Pond Co., Hartford, has become affiliated with the Indian Purchasing Mission in New York. Mr. Derby is technical consultant to Brig. Gen. C. S. Tute, chief of the mission.

• **Genevieve O. Edlund** has been elected president of the Edlund Machine Co., Inc., Cortland, N. Y., at a recent meeting of the company. E. A. Dunning continues as vice-president and general manager.

• **Louis H. Burr,** for 17 years production manager of the Austin Co.'s steel fabricating division, has been named works manager to succeed the late James E. Ferguson. Mr. Burr attended school in Toledo, Ohio, and was graduated from Denison University in 1906. He was structural superintendent of the Toledo Bridge & Crane Co. for a number of years and was associated with the Case Crane & Engineering Co. immediately prior to joining the Austin Co., Cleveland, as production manager in 1924.

LOUIS H. BURR, works manager of the steel fabricating division of the Austin Co., Cleveland.

E. J. McPHEE, general superintendent of the Dodge Truck division, Chrysler Corp., Detroit.

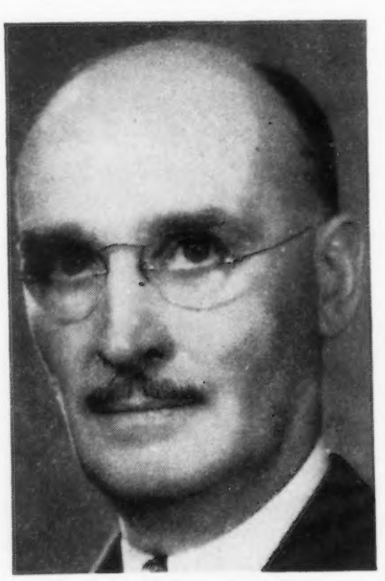
• **E. J. McPhee** has been named general superintendent of the Dodge Truck division, Chrysler Corp. Mr. McPhee has been superintendent of assembly since production of Dodge trucks was started in the new Mound Road plant in September, 1938. He was one of a group of manufacturing officials who helped map production processes and lay out the Dodge truck plant. Formerly he had been chief inspector of production at the Chrysler Highland Park plant and superintendent of assembly at the Chrysler Jefferson plant. He has been in the automobile business for more than a quarter of a century.

• **Walter S. Peckinpaugh** has joined the Skybryte Co. of Cleveland as sales representative in that district.

• **Dean Rollans** has been appointed general sales manager of the Wickwire Spencer Steel Co. and its subsidiary, the American Wire Fabrics Corp., with combined offices in New York. Mr. Rollans replaces A. G. Bussmann, who has resigned because of ill health. Born in Fayetteville, Ark., in 1899, Mr. Rollans received his formal education at the University of Arkansas. Before joining Wickwire Spencer in 1928, he was connected with the International Supply Co. of Tulsa, Okla., serving in the capacity of assistant credit manager for eight years. In 1930 he was made general credit manager and assistant treasurer of Wickwire Spencer.

• **H. G. Barnes** has been appointed vice-president and general manager in charge of the Gould Commercial division of the National Battery Co. with offices in Depew, N. Y. Born in Minnesota in 1898, Mr. Barnes spent the early part of his life in St. Paul, where he attended St. Paul Central High School. His education at the University of Wisconsin was interrupted by the war, but after serving in the artillery for a year and a half, he returned to the university, graduating in 1921. From 1921 to 1923 Mr. Barnes was engaged in industrial engineering. He organized the Motor Power Equipment Co., St. Paul, in 1924 and the Industrial Credit Co., also of that city, in 1932, serving as president of both these companies until December, 1940, at which time he resigned to take his present position with the National Battery Co.

• **Raymond E. Christie** has been recently elected vice-president and director of the Crucible Steel Co. of America at New York. Previously assistant to the president, Mr. Christie has had a long and varied experience with the Crucible organization in branch and executive office posts.



RAYMOND E. CHRISTIE, vice-president and director, Crucible Steel Co. of America, New York.

Obituary

• **Dee J. Sterrett,** past president of the Detroit Engineering Society and widely known in general engineering circles in Detroit, died Feb. 26. He was buried at Milan, Mich. Born in 1882 at Cherry Creek, N. Y., Mr. Sterrett had been a resident of Detroit for 30 years He was a civil engineer.

• **Alphonse S. Campbell,** founder of Campbell Products, Inc., manufacturers and suppliers to the automobile industry, died Feb. 19 of a heart ailment aboard the S.S. Brazil, off the coast of South America. His home was at Green Gates, Duxbury, Mass., but a great deal of his time was spent in Detroit, where he was a member of the Recess and the Detroit Athletic Clubs.

• **Milton E. Miller,** employed for more than 30 years by Packard Motor Car Co., died Feb. 26 in Cincinnati where, since December, he had represented Packard in procurement of defense plant equipment. Mr. Miller had retired in April, 1937, but was recalled when the company needed his services in the armament program. He was 64 years old. Born in Troy, Ont., Mr. Miller came to the United States in 1895 as a salesman for a threshing machine concern.

• **Frederick Charles Sutter,** founder and first head of the Pittsburgh Transformer Co., Pittsburgh, was buried at Detroit on Feb. 26. Born 70 years ago in Detroit, Mr. Sutter was a graduate engineer with the Westinghouse Co., prior to forming the transformer firm. He retired and moved to Detroit in 1910.

• **Dr. B. P. Haigh,** inventor of the Haigh testing machine used for investigating fatigue of metals, died in England late in January aged 56 years. Recently Dr. Haigh who had been appointed scientific adviser to the Engineering Research Laboratory of the Admiralty at the outbreak of the war, suggested the method adopted by the British for overcoming magnetic mines. As a lecturer on applied mechanics at the Royal Naval College, Greenwich, at the time of the last war, Dr. Haigh was called upon to investigate numerous problems troubling the Navy. One of these was the short life of steel tow ropes. It was through his research into this problem of vibration of steel cable that he entered the field of metals fatigue. Prior to joining the faculty of the Royal Naval College, Dr. Haigh was employed by Brown Bros., Edinburgh, and was assistant to Professor Archibald Barr, Glasgow University.

• **James E. Ferguson,** 65, manager of the fabricating division of the Austin Co., Cleveland, for 21 years, died March 3 in a Cleveland hospital after a very brief illness. Prior to joining the Austin Co. he had served as production manager of the Toledo Bridge & Crane Co., and as plant manager of the American Steel Car Co., Havana, Cuba.

• **Richard C. Feltes,** production engineer of the Cincinnati Planer Co., died last Saturday at his home in Cincinnati. He was 56 years old. Mr. Feltes started his career as a conductor for a railroad company, but left this 27 years ago to found the U. S. Electric Tool Co. in partnership with his brother, the late George Feltes. After they had operated this business for 17 years, they obtained the controlling interest in the Standard Electric Tool Co., of which Mr. Feltes was vice-president and secretary until about three years ago, when he became associated with the Cincinnati Planer Co.

• **Adolph F. Ellfeldt,** founder and president of the Ellfeldt Hardware & Machinist Supply Co., Kansas City, died Feb. 21, aged 71 years. Mr. Ellfeldt, who was born in the German province of Brandenburg, knew only a dozen words of English when he entered the hardware business in Kansas City. For forty years he was an active figure in the Kansas City Building and Loan Association.

• **Howard Ashley Pedrick,** Philadelphia, portable machine tool inventor, died March 5 in State College, Pa. Mr. Pedrick, who was 78 years old, retired three years ago as president of the Pedrick Tool & Machine Co., a firm which he established with his brother in 1913, after serving an apprenticeship under his father at the machine shop of Pedrick & Ayer in Woodstown, N. J. He was the author of a book, "Jungle Gold," which recited his experiences during three years spent building a railroad and digging for gold in Dutch and French Guiana.

• **Charles R. Creighton,** since 1905 a production engineer with Ford Motor Co., died recently in Detroit. Mr. Creighton was born in Louisville, Ky., 59 years ago. He joined the Ford company after serving with Russell Engineering Co., Massillon, O., the Burroughs Adding Machine Co. and the Olds Motor Works.

• **Richard W. Yeats,** born in Port Huron, Mich., 74 years ago, died of a heart attack on March 7. He was president of the E. T. Barnum Iron & Wire Works, the firm with which he won employment as an office boy when he first came to Detroit.

• **A. J. Lindemann,** former president and chairman of the board of the A. J. Lindemann & Hoverson Co., Milwaukee stove manufacturers, died at a Milwaukee hospital March 12. He would have been 87 on March 26. He was born in Hamburg, Germany, and came to Milwaukee with his parents in 1863. He learned the trade of tinsmith in the shop of William Frankfurth. In 1875 with his father he organized Lindemann & Son, tinsmiths. In 1890 he organized Lindemann & Hoverson. He originated many improvements in stove design and manufacture.

• **John H. Moss,** aged 70, retired vice-president and superintendent of the Rockwell Mfg. Co., Milwaukee, past president of Kiwanis International and a leader in Masonic affairs, died March 10 at his home in Milwaukee. His father founded the Rockwell firm and John Moss became associated with it 40 years ago after graduating from the law school of the University of Wisconsin.

• **Harry P. Finley,** for twenty years employed in supervisory capacities with American Auto Trimming Co. and Fisher Body Division of General Motors Corp., died March 12 at the age of 57. For the past five years he had been employed in the Violations Bureau of the Detroit traffic court.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Mar. 18, 1941	Mar. 11, 1941	Feb. 18, 1941	Mar. 19, 1940
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

	Mar. 18, 1941	Mar. 11, 1941	Feb. 18, 1941	Mar. 19, 1940
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06
No. 2, Birmingham	**20.38**	19.38	19.38	19.38
No. 2, foundry Chicago†	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	24.34
Basic, Valley furnace	23.50	23.50	23.50	22.50
Malleable, Chicago†	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago	30.34	30.34	30.34	30.34
Ferromanganese‡	120.00	120.00	120.00	100.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	$21.00	$21.00	$21.00	$16.75
Heavy melt'g steel, Phila.	20.00	20.00	20.00	17.25
Heavy melt'g steel, Ch'go	20.00	20.00	19.25	15.625
Carwheels, Chicago	20.25	20.25	20.25	17.00
Carwheels, Philadelphia	23.00	23.00	23.00	20.25
No. 1 cast, Pittsburgh	**23.25**	22.75	22.25	18.25
No. 1 cast, Philadelphia	24.50	24.50	23.75	20.25
No. 1 cast, Ch'go (net ton)	**21.25**	20.75	19.25	13.50
Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$5.50	$5.50	$5.50	$4.00
Foundry coke, prompt	5.75	5.75	5.75	5.25
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	11.50
Copper, Lake, New York	12.00	12.00	12.00	11.50
Tin (Straits), New York	**52.25**	51.875	51.75	46.50
Zinc, East St. Louis	7.25	7.25	7.25	5.75
Lead, St. Louis	5.60	5.60	5.50	5.10
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 145-154 herein.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
March 18, 1941	2.261c. a Lb.	$23.61 a Gross Ton	$20.33 a Gross Ton
One week ago	2.261c. a Lb.	$23.45 a Gross Ton	$20.33 a Gross Ton
One month ago	2.261c. a Lb.	$23.45 a Gross Ton	$20.08 a Gross Ton
One year ago	2.261c. a Lb.	$22.61 a Gross Ton	$16.54 a Gross Ton

	High	Low	High	Low	High	Low
1941			$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$20.00, Feb. 11
1940	2.261c., Jan. 2	2.211c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on averages for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Mandatory priorities applied to alloy steels, armor plate and list of machinery . . . Army and Navy preference ratings given force of priorities in administrative order . . . "All out" aid to democracies will put industry on wartime basis with curtailment of normal business.

THAT industry will quickly be placed on a wartime basis was assured by President Roosevelt's promise of "all out" aid for the democracies of the world, OPM Director Knudsen's statement that industrial production must be accelerated 60 per cent, and by Director of Priorities Stettinius' first administrative order which puts into immediate effect a broader, faster application of mandatory priorities.

The first administrative order of the Division of Priorities validates the preference ratings that have been issued by the Army and Navy Munitions Board, giving them the force of mandatory priorities, and adds a list of critical items for which mandatory priorities will be issued. These include alloy steels and armor plate and a long list of machinery.

Pressure for speed and greater production of implements of war gives rise to the logical assumption that an intensified program of curtailment and rationing of civilian supplies is inevitable.

WHILE conditions in steel, other than alloys, have not reached a critical phase which would suggest the immediate imposition of mandatory priorities, the capacity and supply situation in certain products, particularly shapes, plates, sheets and strip and stainless steel is being canvassed by the OPM by means of a questionnaire returnable this week.

Many steel consumers other than defense contractors are not getting all the steel they want, but they are getting all that the steel companies contend they are entitled to under the present system of allocation, which is based on past purchases. Some steel users are seeking two or three times the amount of steel they have normally used even in their best years. This is particularly true in consumer goods lines.

What is happening in many manufactured articles in which steel is the principal raw material is illustrated by the accelerated rate of automobile production. In the past six months, ending with this month, the automobile industry will have produced about 600,000 more cars and trucks than in the corresponding period a year ago, a gain of 25 per cent. Its current steel purchases indicate a plan to go through the usually dull summer months with no more interruption than may be caused by material and labor shortages. Some steel companies have been obliged to curtail their allotments to the automobile industry, which is estimated to be getting not less than 15 per cent and perhaps as much as 18 per cent of current steel shipments.

PRODUCTION of steel this week has hit an all-time high. While the percentage rate of 99½ was exceeded in 1929, capacity then was much less than now, so that actual output is exceeding all records. The Chicago district, up two and a half points, is now at 101½ per cent. The Pittsburgh district has gained a point to 101 per cent. At St. Louis a gain of 5½ points brings the rate there to 111 per cent.

A survey just completed indicates that steel is being produced at a rate faster than it is being consumed, which means that inventories are still being accumulated by many users.

While concrete results have not yet flowed from the enlarged industrial program authorized by the Lease-Lend bill, there is every indication that an expansion of steel orders will come soon after the necessary appropriations have been legislated. A new shipbuilding program is a certainty. A tentative plan involves the construction of several hundred additional ships which will require not less than 1,000,000 tons of steel, but work on these may not be started before late this year. British and Canadian orders are expected to expand soon, and there have been inquiries from Greece and Turkey. All of these countries and some others will obtain the benefit of mandatory priorities.

IRON and steel scrap will be placed under stricter Government control. Price differentials on various grades and for various districts will probably be announced within a week by the Price Stabilization Division, National Defense Commission. Meanwhile the scrap supply situation is giving concern to steel companies, which are eating into stock piles. Using the emergency powers of the Army and Navy, the Price Stabilization Division will resort to requisitioning of scrap if it is found that it is being withheld from the market.

THE IRON AGE scrap composite is unchanged at $20.33. The pig iron composite has risen to $23.61.

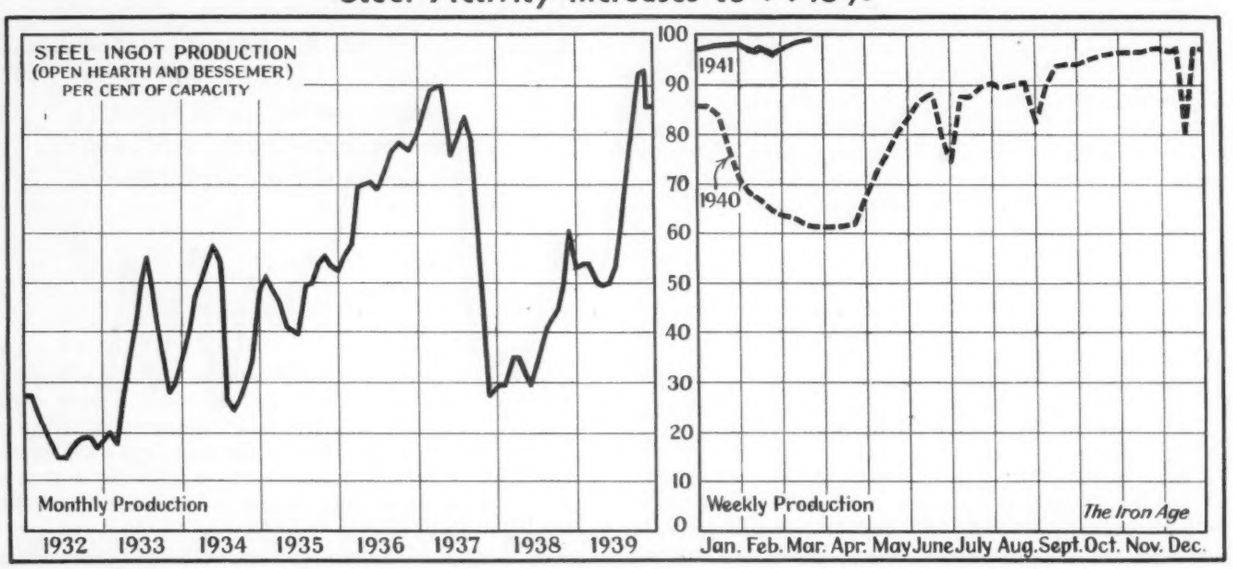
Formal conferences between the Steel Workers Organizing Committee and Carnegie-Illinois Steel Corp. over wages and other issues will be begun at Pittsburgh on Thursday of this week. If agreement is not reached by April 1, the discussions may be extended by mutual consent.

The Industrial Pace . . .

AS THE RESULT OF A DECLINE in lumber carloadings and less than seasonal advances in the automobile and heavy construction components, THE IRON AGE index of capital goods activity eased for the third successive week. The index for the past week was 121.7, a 1.3 point decline from the previous week. Steel ingot production rose to 99 per cent of capacity in the week. Automobile output, 131,410 units, was the highest since the week ended May 29, 1937, when 132,425 cars were assembled, and compared with 125,915 in the previous week. Heavy construction awards, $132,626,000, were up 28 per cent.

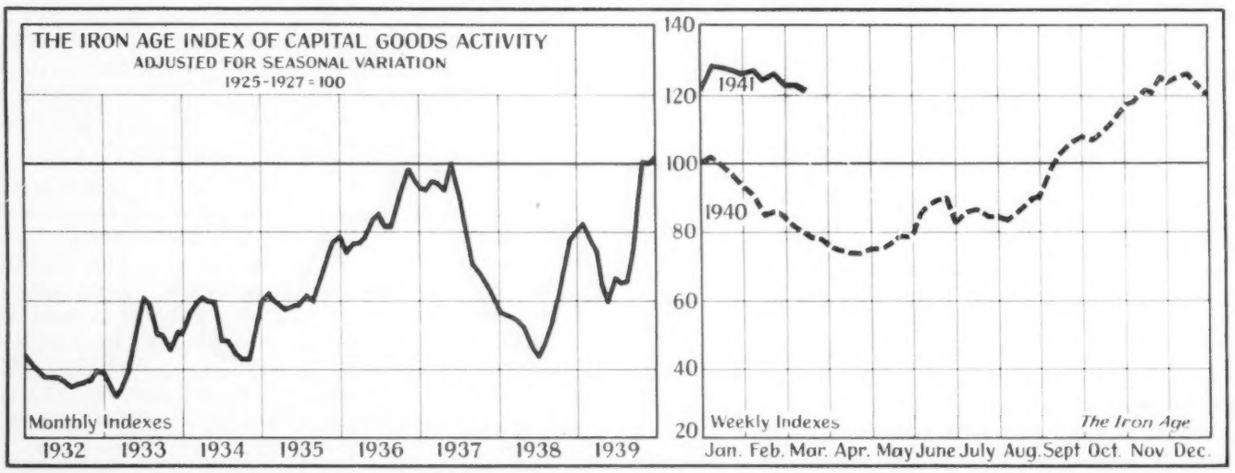
ALTHOUGH TOTAL SHIPMENTS of finished steel by subsidiary companies of the U. S. Steel Corp. in February, 1,548,451 tons, were down from the January total of 1,682,454 tons, on a daily basis they were almost 2 per cent heavier, and were 59 per cent above February, 1940. January exports of iron and steel were 653,798 tons (excluding scrap), as compared with 735,178 tons in January and 396,064 tons in February, 1940. Heavy construction in February totaled $435,401,000, third highest monthly volume on record, as compared with $584,549,000 in January, and $290,928,000 in February, 1940.

Steel Activity Increases to 99.5%


STEEL INGOT PRODUCTION
(OPEN HEARTH AND BESSEMER)
PER CENT OF CAPACITY
Monthly Production
1932 1933 1934 1935 1936 1937 1938 1939
1941
1940
Weekly Production
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
100 90 80 70 60 50 40 30 20 10 0

District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week . .	101.0	101.5	99.0	96.0	100.0	106.0	85.0	96.0	95.0	103.0	102.5	111.0	87.0	99.5
Previous Week . .	100.0	99.0	99.0	96.0	100.0	104.5	85.0	100.0	95.0	108.0	102.5	105.5	101.5	99.0

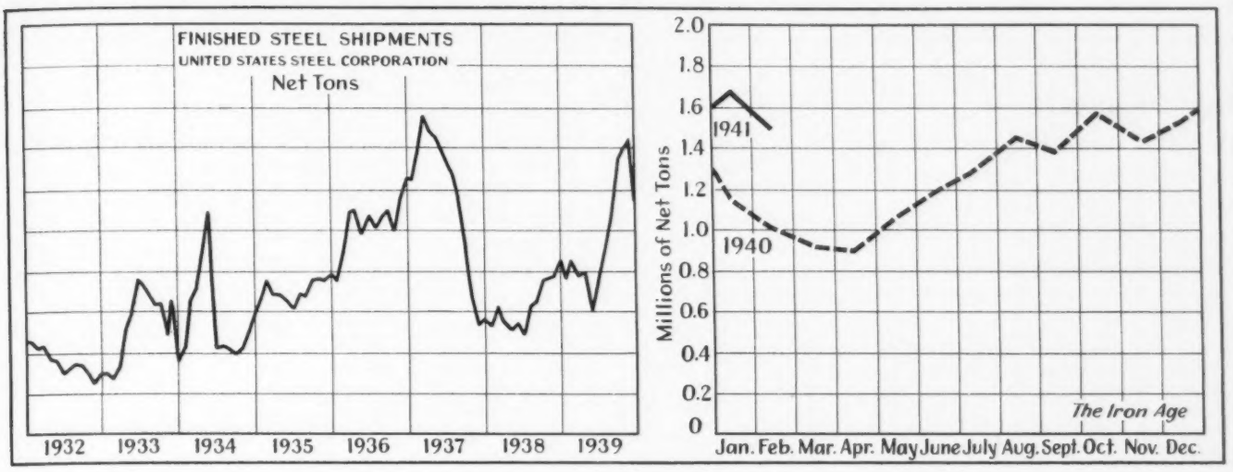
Seasonal Tendencies Influence Lower Index


THE IRON AGE INDEX OF CAPITAL GOODS ACTIVITY
ADJUSTED FOR SEASONAL VARIATION
1925-1927 = 100
Monthly Indexes
1932 1933 1934 1935 1936 1937 1938 1939
1941
1940
Weekly Indexes
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept Oct. Nov. Dec.
140 120 100 80 60 40 20

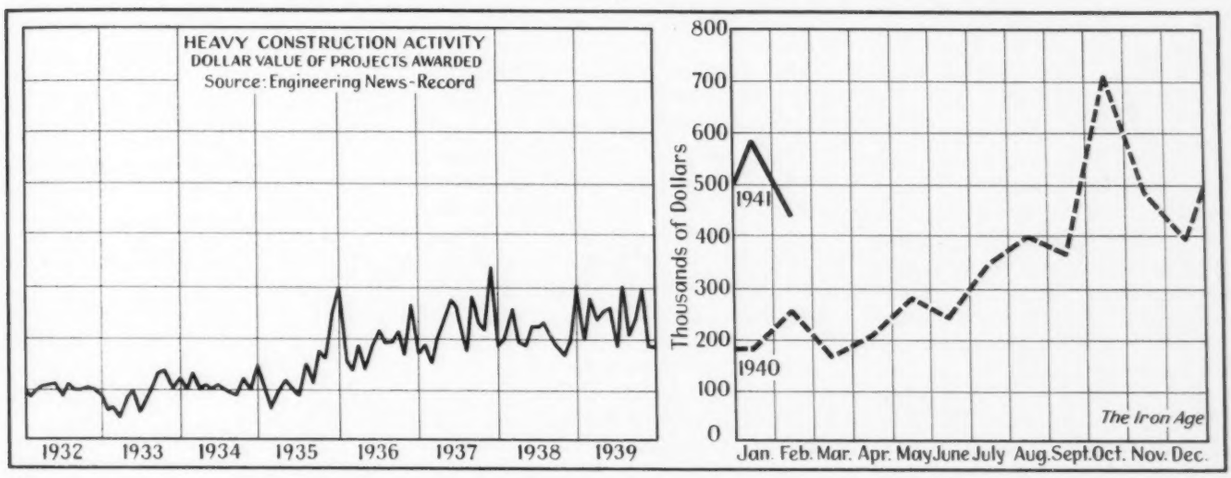
Component — Week Ended ➤	Mar. 15	Mar. 8	Feb. 15	Mar. 16 1940	Mar. 16 1929
Steel ingot production[1]	130.3	130.2	130.1	81.7	118.4
Automobile production[2]	124.7	125.5	134.7	100.4	127.5
Construction contracts[3]	158.1	159.4	154.5	72.0	143.0
Forest products carloadings[4]	70.1	74.5	73.2	57.6	115.6
Pittsburgh output and shipments[5]	125.4	125.4*	127.7	89.9	116.5
COMBINED INDEX	121.7	123.0*	124.0	80.3	124.2

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record*; [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended March 8. Other indexes cover week of March 15.

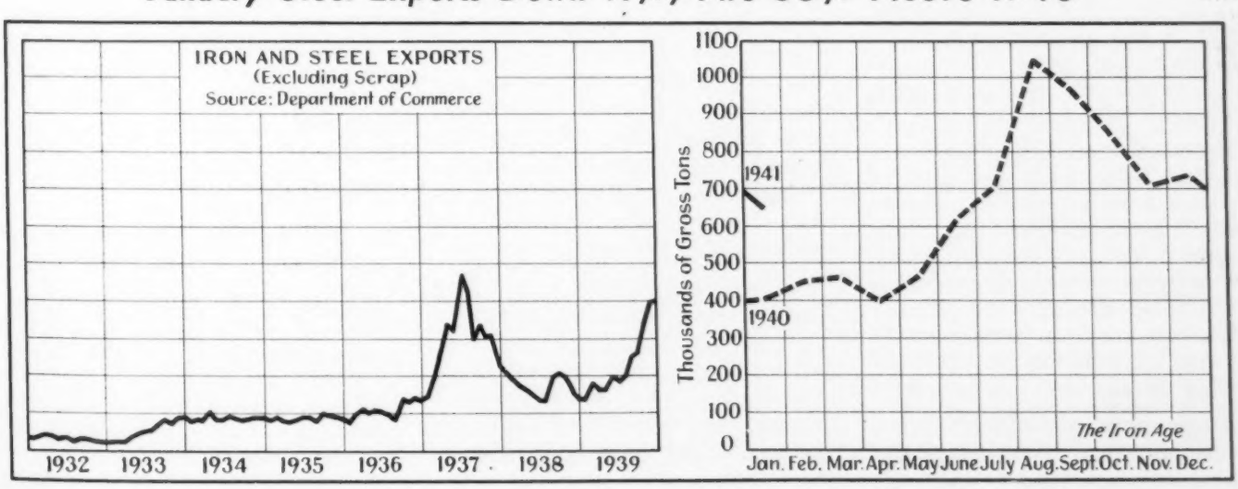
Daily Shipments of U. S. Steel Corp. Up 2% in February


FINISHED STEEL SHIPMENTS
UNITED STATES STEEL CORPORATION
Net Tons
1932 1933 1934 1935 1936 1937 1938 1939
Millions of Net Tons
2.0 1.8 1.6 1.4 1.2 1.0 0.8 0.6 0.4 0.2 0
1941
1940
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Building Awards in January Third Highest on Record


HEAVY CONSTRUCTION ACTIVITY
DOLLAR VALUE OF PROJECTS AWARDED
Source: Engineering News-Record
1932 1933 1934 1935 1936 1937 1938 1939
Thousands of Dollars
800 700 600 500 400 300 200 100 0
1941
1940
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

January Steel Exports Down 11%; Are 65% Above 1940


IRON AND STEEL EXPORTS
(Excluding Scrap)
Source: Department of Commerce
1932 1933 1934 1935 1936 1937 1938 1939
Thousands of Gross Tons
1100 1000 900 800 700 600 500 400 300 200 100 0
1941
1940
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

. . . OPM making survey of capacity and orders in some products

Concrete results in the form of steel specifications have not been noted yet because of the passage of the Lease-Lend Bill but increased activity is expected momentarily. PITTSBURGH sources look for the initial flow of orders to involve finished steel products which will be reflected in steel bookings from American manufacturers. It is also expected that direct British orders for defense steel products will soon expand considerably over the 300,000 to 325,000 ton a month level which existed both in January and February. PITTSBURGH sees no abatement in fresh orders which are totaling from 5 to 8 per cent ahead of the banner February month.

Steel companies last week were asked by the OPM to supply complete capacity, production and unfilled tonnage data for structural shapes, plates, stainless steel and sheets and strip. This information is expected to be transmitted to Washington by March 19. It is believed the data will form a broad fundamental base which will be used in making subsequent decisions as to whether steel priorities are necessary on the products named. Plates, structural shapes and stainless steel have figured prominently in defense jobs but this has not been true of sheets and strip. It may be that the OPM is exploring possibilities of increased plate production on high speed strip-sheet mills.

PITTSBURGH steel producers insist that there is no fundamental need for steel priorities and some operating officials have expressed a private opinion that should priorities be promulgated, subsequent efficiency on steel production and shipments would be from 5 to 10 per cent less than that obtained under the present voluntary system.

Attaining a new high in ingot production this week, CHICAGO steelmakers are clearly doing all possible to meet the demand for steel. Indicative of results is the fact that deliveries generally did not lengthen this week, sheets alone taking a slight step backward in some cases. All urgent defense demands are given a clear track and regular customers are getting their necessary share.

Buying in the past week fell below the previous week at some mills, while in others it held its own. The month is slightly ahead of the previous period but incoming business is under control and shipments are at full steam ahead.

While steel mills at CLEVELAND experienced continued steady demand last week, warehouses bore the brunt of sharply increased pressure from consumers. The week was the biggest in the history of one large warehouse offering a general line of items.

Meanwhile, Army procurement officers attending a series of defense meetings at CLEVELAND indicated that only a bare start has been made in their purchasing. The heavy expenditures in the next few months will include many shell awards and will force subcontracting to an unprecedented degree, it was indicated. The ability to fulfill quick deliveries will play a key role hereafter in the placing of awards.

No overnight change in the status of steel orders already booked is likely, however.

Record bookings continue at BIRMINGHAM. One producer during the first 11 days of March received orders amounting to 73 per cent of February's total. Customers are becoming reconciled to extended delivery on bookings currently placed but considerable pressure is being exerted, it is reported, to obtain delivery on orders placed last October and November.

Wholesale hardware dealers are having extreme difficulty in obtaining delivery on products requiring skilled labor, such as hand tools. One dealer, who recently ordered repair parts for a hand drill, has been promised delivery for February, 1942.

Prices

. . . Second quarter anouncements still held up

The belief still prevails that second quarter price announcements must await definite indication of the trend in wage negotiations to be held at PITTSBURGH this week between Carnegie-Illinois Steel Corp. and the SWOC.

Steel Operations

. . . Industry rate rises half a point to 99½ per cent

On a tonnage basis, steel ingot production is the highest on record, having gained a half point this week to 99½ per cent. While on a percentage basis, this rate was exceeded in 1929, steel capacity was much lower then than now.

Nearly all districts are operating at maximum capacity or very close to it. An exception is the WHEELING-WEIRTON district, which is estimated at 85 per cent, but this is merely because the Mingo Junction plant of Carnegie-Illinois Steel Corp., which was once taken off the capacity list and then restored, has not yet attained a high rate of operation. Other plants in that district are operating at capacity.

CHICAGO this week joined the districts that are exceeding a 100 per cent rate. A gain of two and a half points there brought the CHICAGO rate up to 101½ per cent. PITTSBURGH is up one point to 101 per cent. The BUFFALO district gained a point and a half to 106 per cent and the ST. LOUIS district gained five and a half points to 111 per cent.

Pig Iron

. . . Price announcements for second quarter still withheld

Many of the producers of merchant pig iron have not formally opened their books for second quarter tonnage, but some of them are taking orders to be shipped at price in effect at time of shipment. Until a wage agreement has been arrived at between the coal operators and

the United Mine Workers the question of future pig iron prices must remain in doubt, since a higher price for coke, brought about by increased coal costs, would affect pig iron costs.

Allocation of available pig iron continues to be the method pursued by a majority of pig iron producers, particularly those steel companies which cater to the merchant trade. Under this method some foundries are not getting all they want, but, it is said, they are getting all that they are entitled to on the basis of past purchases.

Demands of consumers of special analyses are causing some trouble for merchant iron producers. Synthetic special analyses are impracticable to get out because of requiring special burdening on the furnaces and because iron made in moving up to those special grades is not immediately applicable to orders now on the books. Too much valuable time is lost, makers contend, in producing irons that are in between the standard and special grades.

Shipbuilding

. . . A new program will be inaugurated under lease-lend bill

A new merchant shipbuilding program at least doubling the one now being carried out is one of the certain results of the enactment of the lease-lend bill. Although plans are still tentative, it is reported that not less than 750 new ships will be contracted for, these to require 1,000,000 tons or more of steel. In all probability, however, actual building of these ships will not be begun until late this year.

A total of 594 vessels aggregating 3,798,728 gross tons are now under construction or contract, according to a report by the American Bureau of Shipping. This total includes 60 ships ordered by the British and the 200 "ugly ducklings" to be built for the United States in seven shipyards provided for in President Roosevelt's program announced last December.

At the peak of ship construction during the first World War the program called for 2368 ships of 13,616,836 displacement tons. This difference is not as great as it seems because the 1918 figure is in displacement tonnage, which runs considerably higher than the measurement in gross tons.

Railroad Buying

. . . Orders total 1800 freight cars, 95 locomotives

With the announcement of Southern Pacific's extensive buying program, this week's orders total 1800 freight cars, 95 locomotives and new inquiries amount to some 3000 freight cars.

Southern Pacific lines have ordered 40 cab ahead steam locomotives from the Baldwin Locomotive Works. These will be among the heaviest and most powerful engines in the world. They also bought 10 streamlined daylight-type passenger engines from the Lima Locomotive Works. Furthermore, 25 1000-hp. diesel-electric switching locomotives were placed as follows: 10 from American Locomotive Co., 10 from the Electro-Motive Corp. and five from Baldwin. These are in addition to 15 smaller units, the purchase of which was reported in THE IRON AGE of Feb. 13. About 2500 freight cars are to be built under the construction program, some of these in company's shops and 500 all-steel box cars have been allocated to the Bessemer, Ala., plant of the Pullman-Standard Car Mfg. Co. The cost of the program is said to be $20,000,000.

Chicago, St. Paul, Minneapolis & Omaha has awarded 750 box cars to American Car & Foundry.

Tennessee Coal, Iron & Railroad Co. has ordered 90 ore and 85 hopper cars of 70-ton capacity from Pullman-Standard.

Chicago, Indianapolis & Louisville is taking 100 flat and 150 box cars from Pullman-Standard.

Lehigh & New England has ordered 110 covered bulk 70-ton cement cars with hopper bottoms from the American Car & Foundry.

Missouri Pacific purchased two diesel-electric 4000-hp. engines from the Electro-Motive Corp, and 11 streamlined cars from the Edward G. Budd Mfg. Co.

General Electric has received orders for 18 diesel-electric locomotives between 300 and 380 hp. capacity. Of these six were bought by the Navy and seven by the Army, three by the Boston & Maine and one each by Piedmont & Northern and the St. Paul Union depot.

Delaware & Hudson is in the market for between 500 and 900 freight cars of hopper and gondola types. Canadian Pacific wants 250 50-ton twin hopper freight cars. Chicago, Milwaukee, St. Paul & Pacific is inquiring for 13 light road and switching locomotives, one 5400 hp. freight and two 4000-hp. passenger engines. All are to be diesel-electric.

Semi-Finished Steel

. . . Non-integrated mills having more difficulty

Because some steel makers who had formerly furnished semi-finished supplies to certain non-integrated consumers have been forced out of the picture by their own requirements, the demand for sheet bars and rerolling billets from non-integrated steel concerns has become stronger than ever. The situation is further complicated by British semi-finished steel requirements, which are being accorded the same treatment as United States defense projects. Some alleviation has gradually appeared due to further utilization of idle equipment, even though the latter necessitates bringing raw materials long distances.

Unceasing demand from forge shops in Ohio and Michigan has been experienced by CLEVELAND sellers recently and has intensified semi-finished markets.

Plates

. . . Producers are furnishing data to OPM on orders

Plate producers have been asked by the OPM to furnish capacity and unfilled tonnage information so that Washington officials may have material in reaching future decisions as to whether priorities are necessary. Plate makers insist that the present voluntary system is taking care of defense projects as much as humanly possible and that any interference with this setup could only result in less efficient production and shipment because of special conditions which would be started in motion by priorities. Additional ship-building tonnage is a certainty as a result of the President's message last Saturday, wherein "all out" aid was pledged to Britain, both from the standpoint of material as well as transportation.

Great Lakes shipbuilders appar-

ently will be in the plate market more extensively over the balance of this year. CLEVELAND reports that one company is figuring on obtaining the award of 25 to 50 small naval craft, each requiring probably 300 tons, mostly plates. In the near future two large ore carriers are expected to be awarded which would require several thousand tons additional in structural shapes and plates. Alloy plate steel for several hundred tanks for the British has been allocated.

CHICAGO mills are turning out plates at top capacity and consequently delivery promises, generally, have not lengthened. Keen scrutiny of new specifications insures urgent needs getting prompt attention.

About 18,000 tons of plates for the construction of six cruisers at an eastern shipyard have been placed at three district mills, in addition to 2500 tons of structural shapes. The placement of 12,000 tons of armor plate is pending. An eastern railroad expects to place tonnage against a recently announced new car program within the next week. Practically all producers are quoting longer deliveries and one large mill is very close to being sold out for the year. The completion of new facilities at district shipyards in the near future will give additional strength to this source of demand, currently taking heavy tonnages.

Tubular Goods

. . . Pipe sales are showing gains over February

A brisker movement of merchant pipe, a further pickup in miscellaneous line pipe orders, and a slight increase in oil-country goods demand are registered at PITTSBURGH, where total tubular sales are running ahead of February bookings.

Structural Steel

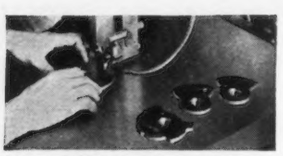
. . . Awards 25,100 tons and new jobs 28,725 tons

Fabricated structural steel awards declined to 25,100 tons from 35,750 tons last week. The largest lettings include 6000 tons for curb angles in New York; 2000 tons for the Fisk Street Station of the Commonwealth Edison Co., Chicago; 1500 tons for the Cleveland Graphite Bronze Co., Cleveland; 1500 tons for a crane and shipways for the Sun Shipbuilding Co., Chester, Pa.; 1400 tons for the Ninth Street bridge, Washington, and 1200 tons at Philadelphia for crane runways for Drydock Associates.

New structural steel projects advanced to 28,725 tons from 18,250 tons. Outstanding new jobs are 10,000 tons for government warehouses at Atlanta, Ga., on which bids are in; 2500 tons for a transit shed at San Diego, Cal., for the Naval Air Station; 2300 tons in Tonawanda Township, N. Y., for an addition to the Charles R. Huntley steam plant of the Buffalo-Niagara Electric Corp., on which bids have been taken; 1200 tons for a bridge at Far Rockaway, N. Y., for the Long Island Railroad Co.; 1100 tons at Los Angeles, for the Slauson Avenue bridge for U. S. Engineers, and 1000 tons at Bucy-

HARD JOBS MADE EASY ON THE DoAll

C. A. Weidner & Sons, Rochester, N. Y., are now able to do highly specialized metal cutting jobs that would be difficult, tedious and prohibitive in cost without their DoAll Machines.



Screw Machine Cams, averaging ⅜" thick and 8" diam. cut on a DoAll at Remington Rand, Inc., Elmira, N. Y.

Locking Cam and Cam Stop made of oil hardening tool steel cut directly on the DoAll (no die required) by Taylor Instrument Co., Rochester, N. Y.

SPEED UP DEFENSE WORK

Time—that's what we're all working against, not only in our defense program, but in regular industrial production. Wherever metal is shaped, cut and used, the DoAll Contour Machine can effect surprisingly large savings in time, labor and material. It's today's indispensable tool.

NEW—MODEL V-60

A brand new model with three 26" wheels, the third one to give it a throat 60" deep. Handles large size and odd shaped metal parts and products.

Four of these are in use at the Canadian General Electric Co.

Investigate the DoAll immediately. Let us send a factory trained man to your plant to show you what a DoAll can do for you.

FREE—Ask for Literature on all DoAll Machines or 158-page Handbook on Contour Machining.

CONTINENTAL MACHINES, INC.
1311 S. Washington Ave., Minneapolis, Minn.

New DoAll Grinder with Hydraulic Table Movements

A super precision surface grinder—a real production tool. Less vibration because motor is built right on ball-bearing spindle. Work table travel is infinitely variable, up to 50 f.p.m. and has exceptionally large bearing surface.

rus, Ohio, for a fluoroscent lamp plant for the General Electric Co.

CLEVELAND reports that the amount of work being figured by some of the large general contractors assumes very large proportions. One Cleveland company is reported to have on its pending list around 30,000 tons of steel which will be placed over the near future for various projects around the nation.

Merchant Bars

. . . Lease-lend bill expected to accentuate demand

Hot rolled bar demand is stronger at PITTSBURGH. Material slated for national defense purposes is becoming an increasingly larger part of current shipments. Passage of the lease-lend bill is expected to accentuate this condition since British defense requirements rate the same attention as United States defense requirements. Automotive centers, which are rushing pell mell to produce the greatest output of cars on record, remain one of the heaviest commercial buyers of hot and cold rolled bar stock.

Shell steel orders and requirements of the agricultural implement industry have been prominent among the broadly diversified buying encountered at CLEVELAND recently. Shipments to implement industries are exceptionally heavy. Farm mechanization apparently will increase to a level never before attained. Record production schedules on such equipment as pick-up balers are being set up by implement makers.

Flat bar deliveries in eastern Pennsylvania have been pushed back to fourth quarter with angles not far behind. Rounds and squares are still available in August and September.

Automotive demand in CHICAGO is heavy—but the same is true of defense, in fact, bar orders continue to come from all steel consuming sources. Deliveries have not become more extended in the past week.

Wire Products

. . . All items moving briskly . . . Some deliveries lengthened

Wire products continue to move very briskly, according to sellers at CLEVELAND. Heavy demand for welding wire is encountered. Thousands of tons are going into government building projects, many of which require the joining and grounding of structures in elaborate fashion to avert explosions.

PITTSBURGH reports little or no change in the wire market except that deliveries have become further extended on some products.

Reinforcing Steel

. . . Awards of 24,150 tons include a 15,000-ton job

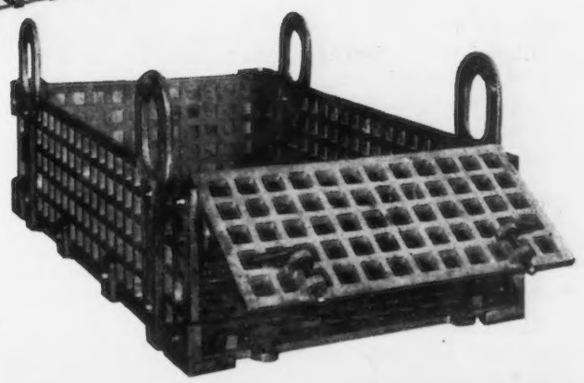
Reinforcing steel awards at 24,150 tons were swelled by 15,000 tons for the Morganza River floodway bridge at Krotz Springs, La. Other sizable lettings are 2400 tons in Franklin County, Ohio, for

Prolong
PICKLING BASKET LIFE

Revolving Basket for Hollow Ware

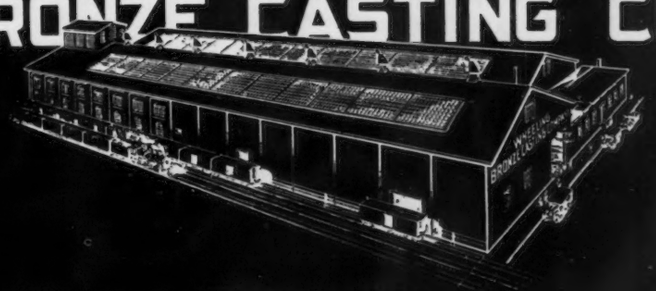
These Super or Stainless B & M Metal Pickling Baskets are first choice of those who pickle hollow ware and heavy forgings.

Built strong-simple-and preserve full strength over long periods. Write today for complete specifications.



For Heavy Forgings Open End Type

WHEELING BRONZE CASTING CO.



WHEELING, W. VA.

buildings for the Curtiss-Wright Corp.; 1500 tons at Milan, Tenn., for the Wolfe Creek ordnance plant; 1330 tons at Lockland, Ohio, for test cells for the Wright Aeronautical Corp., and 1300 tons at St. Louis for the Carr Street housing project.

New reinforcing steel projects of 9325 tons include 2634 tons at Oroville, Cal., for the Pulga and Cresta tunnels; 2200 tons for Los Angeles River improvements, Los Angeles, and 1800 tons for an airplane parts plant at Chicago for the Buick division of General Motors Corp.

Bolts, Nuts and Rivets

. . . March orders heaviest in many years

Climaxing a steady increase in sales volume which has been under way for five straight months, March orders are destined to be the greatest in the recent history of some bolt and nut makers at CLEVELAND. Each month has seen backlogs grow larger despite the fact that production is at an all-time high mark. Average delivery promises of one leading Cleveland manufacturer on standard sizes of bolts and nuts in carloads for jobbers are four to eight weeks. Requirements of the defense program are increasing and are generating much secondary demand. The auto, railroad and implement fields are buying at an unusually high rate.

Sheets and Strip

. . . OPM investigating unfilled tonnage in these products

Sheet and strip tonnage is probably less involved in the national defense picture than most other steel products but, in a special questionnaire sent out by the OPM last week, steel producers were asked to furnish capacity and unfilled tonnage data on sheets and strip. This information, it is believed, will act as a guide on any future action with regard to priorities. Meanwhile, consumers who have become unduly anxious because of long delivery promises show no disposition to cut down their incoming orders, even though definite shipping dates cannot be promised in many instances.

At CLEVELAND, where production this month has been exceptionally heavy, some of the pressure for shipments has eased. Orders for future delivery have been running at approximately the same rate as in the latter part of February.

Slight backward movement in deliveries on some sheet sizes at CHICAGO were not important enough to alter the fact that consumers are getting their requirements. Automotive and accessory manufacturers are supplying extremely heavy demands but most producers are giving them reasonable allocations.

Sustained heavy buying by automotive interests, cabinet and refrigerator makers and other miscellaneous buyers of sheets has increased the volume of bookings scheduled for third and fourth quarter delivery in EASTERN PENNSYLVANIA.

In the SOUTHERN OHIO district, specifications for the third and fourth quarters are increasing in volume, with some consumers extending their orders into the first quarter of 1942. Sheet manufacturers, however, are accepting these extended requests conditionally.

Tin Plate

. . . Cold reduction mills operating at 96 per cent

Cold reduced tin mill operations again approximate 96 per cent, with practically all units scheduling more than the normal 15 turns a week. Tin plate demand at PITTSBURGH and elsewhere ranks about third or fourth in the list of products most sought after.

CHICAGO producers have important backlogs due to earlier-than-usual buying. One mill, with 11 weeks rolling on its books, does not want black plate business but is handling all other needs in an orderly fashion.

Coke

. . . More beehive ovens may be brought in

The rehabilitation and operation of Virginia mines and 100 beehive coke ovens, located at the mines near Birmingham, are being contemplated by Republic Steel Corp. The coal mines have been idle since 1931, the coke ovens since 1918.

Export Trade

. . . Further control over items needed for defense

Effective April 15, control over exports of defense supplies was further tightened by two executive orders made public Monday, one of which restricts shipment abroad of models, designs and specifications of materials or machines that are considered essential to national defense. The other order permits the Administrator of Export Control to restrict exports of goods containing materials which are now under the priority system.

White House Secretary Early, speaking of the first order, said that it is designed to prohibit exportation, except upon the President's consent, of plans and specifications of machine guns, airplanes, war vessels and other weapons and supplies.

The other order not only restricts exportation of products that have been placed under the priority system but also restricts shipment abroad of articles of which such products are components.

AFL Organizes Union At Republic Plant

Cleveland

• • • **An AFL federal** union has been organized and chartered among workers at Republic Steel Corp.'s Corrigan-McKinney works here, and in the high speed strip mill. Other AFL locals have been chartered in Republic plants at Canton, Massillon and Youngstown.

Officials of the CIO here, who have been conducting a strenuous drive for members at the Cleveland Republic plants and signing up many newcomers recently, asserted that the AFL effort so far had interested only a few "disgruntled employees."

Pittsburgh Coal's Output In 1940 Totals 9,868,205 Tons

Pittsburgh

• • • **Pittsburgh Coal Co.** reports net earnings for the year ended Dec. 31, 1940, of $1,255,893, after provisions for federal and state income taxes. This compares with net loss reported for 1939 of $1,068,787.

Non-Ferrous Metals
. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, March 18—Activity in the major non-ferrous markets was generally quieter in the past week. Lead demand was not so strong as in the previous week, while tin sales were not heavy despite higher prices. Copper interest was not as strong as it has been recently. Zinc consumers had to be content with the usual rationing of supplies. All prices, with the exception of tin, remained unchanged.

The short month was clearly reflected in copper statistics for February appearing in the week. Refined stocks declined 19,165 tons to 112,819 tons at the end of the month, not so heavy a reduction as had been expected. Deliveries to consumers also declined to 112,808 tons, as compared with 119,736 in January, although they were heavier on a daily basis. Production was off only slightly to 93,654 tons in February from 93,840 tons in the previous month. With mine producers still allocating domestic production in a fairly moderate fashion, the first loading of cars for shipment of foreign copper began. Large producers' prices were unchanged at 12c., delivered Valley. Interest in the custom smelter market was no stronger, only a fair-sized volume of business being done on the 12.50c. basis.

Lead

Under a much quieter demand, waiting lists disappeared in the past week and sellers were given some respite from the buying pressure of recent weeks. Apparently satisfied with recent heavy takings to cover immediate needs, buyers were content to coast for the present. April needs have been about 65 per cent covered, while March is 100 per cent accounted for, with the exception of carload lots. Sellers are still limiting tonnage to a certain extent in order to meet the needs of all consumers, and buyers are discouraged from placing all the tonnage they might be willing to take. Prices are firm at 5.75c. a lb., delivered New York.

Zinc

In the absence of any new developments in the primary market, attention is being directed to the scrap price situation, where it is expected new decisions may be made shortly. In the regular market little change was noted. Supplies continue as tight as ever, a fact which is reflected in the consistently small tonnages shown in weekly sales reports. Sales dropped off in the past week to 1577 tons, as compared with 3405 tons in the previous week, while shipments were down to 1524 tons from 5507 two weeks ago. Unfilled orders continued to decline, standing at 99,392 tons at the end of the period. The price of prime Western material remained virtually fixed at 7.64c. a lb., delivered New York.

Tin

Since the heavy buying of several weeks ago supplies of tin for prompt shipment have been limited and prices have been sustained in spite of a no more than moderate demand. Prompt Straits metal in the past week rose from 51.875c. to 52.25c. a lb., delivered New York. Most of the buying interest continues to involve prompt metal, although late March arrivals have sold at 52c. and April at 51.875c. Tin shipments coming to this country are running around 12,000 to 13,000 tons a month. Substantial tonnages of South American concentrates are reported ready for shipment to Texas sometime this month for use when erection of the government owned tin smelter has been completed.

(Non-ferrous prices on page 149.)

ANY METAL • ANY PERFORATION

Industrial—Well balanced screens of excellent material and workmanship to assure maximum screen production combined with durability.

Ornamental—Approved patterns and finishes including many exclusive and characteristic designs for grilles and furniture. We invite your inquiries.

The Harrington & King Perforating Co.

5657 FILLMORE STREET—CHICAGO, ILL.

New York Office, 114 Liberty Street

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Subcontracting on The Increase

Cleveland

• • • **At the numerous meetings** held here last week in connection with the defense program Army officers indicated quite clearly that contracts are being awarded much more speedily, with delivery now the all-important factor. In the interval between issuance of letters of intent and the signing of formal contracts much subcontracting and purchasing is done. For example, in two weeks much of the detail has been solved and 30 subcontracts decided upon in connection with a new $20,000,000 project for making Bofors anti-aircraft guns. An Ohio company will get this contract, but most of the work will be in the East. Some parts will come from Canada.

It was indicated that the Army will spend at least four times the amount of money allocated so far. A tremendous amount of subcontracting appears inevitable. It also seems likely that keeping semi-skilled and skilled labor out of the draft or from accepting jobs in the new plants will become a problem more and more difficult to cope with in the future.

Rise in Prompt Deliveries Seen

Chicago

• • • **Machine tool manufacturers** are stepping up production facilities still more as they add small additions to particular spots where needed, even though many previously had erected sizable additions, some of which are already occupied by production lines. Priorities, faster production, increase of prompt deliveries has brought a calmer note to the industry in this section. Many companies have orders for equipment which will go into the three new Studebaker and the Buick aircraft engine plants. In fact, in the case of Buick especially, subcontracting has already started on some of the parts to go into these engines. Buick placed one large gear order with a Chicago firm last week. There is still some dissatisfaction evident on the part of those who have been unable to get priority ratings desired.

Used machinery dealers in the greater Chicago area have started an association of their own, to replace the former one, which has been defunct for several years. In view of conditions imposed by the defense program, dealers feel that an association will give them an official voice in preparedness plans.

Breathing Spell Welcomed

Cincinnati

• • • **The signing of the** lease-lend bill has not yet changed the aspect of the machinery market in this area. The decline in new business which set in approximately three weeks ago, continued during the past week, but has not yet reached serious proportions.

Lower Sales Level Continues

New York

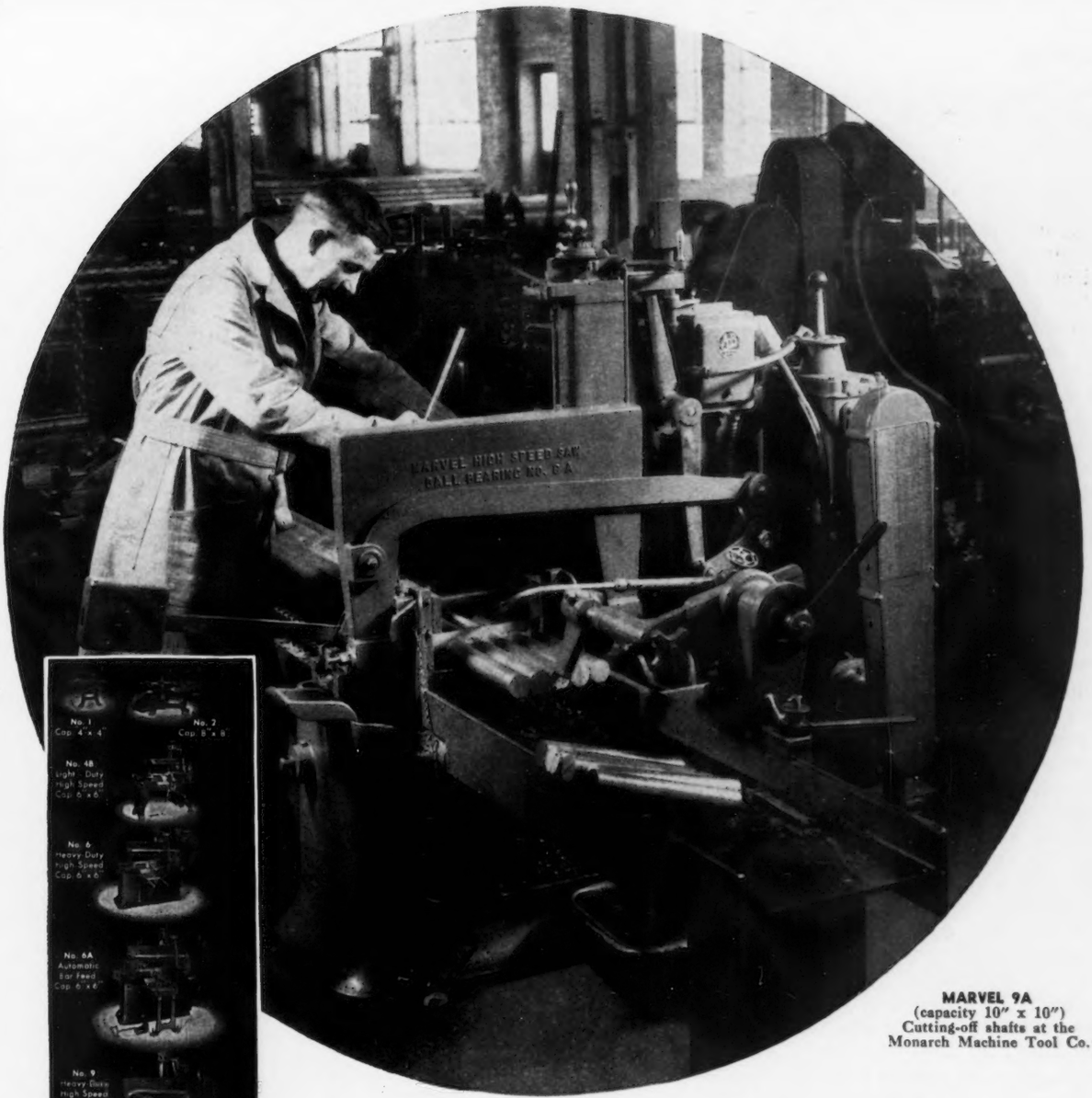
• • • **The lower level** of buying activity continues, but it is expected that a bulge in buying will take place as soon as new Army, Navy or aircraft programs governed by pending defense appropriations are translated into contracts. On the other hand, the government has already given large blanket or protective orders, against which defense contractors have yet to draw. Some sellers look upon such orders merely as confirmation of business already on the books and not as new business, although the general practice is not to consider an order as such until a specific order number is assigned.

Mention has been made in these columns of the large amount of paper work involved in handling orders and invoices for the Defense Plant Corp. account. This work is being augmented now as the result of many orders originally entered in the name of a manufacturer months back being switched within the past week or two to the Defense Plant Corp. account.

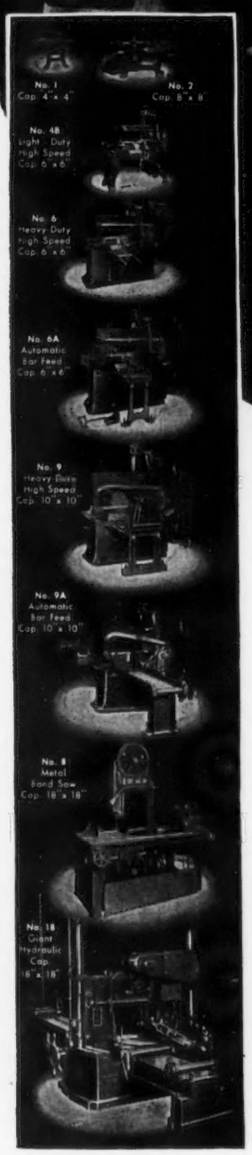
Some planer, boring mill and milling capacity is being uncovered by survey of idle machine capacity.

January Gear Sales Touch New High

REFLECTING the gathering momentum of the defense program, sales of industrial gears in February, excluding automotive gears and gears used in high-speed turbine drives, for the second successive month broke all records and established a new all-time high. The index for February, as compiled by the American Gear Manufacturers Association, was 262, 1 per cent higher than the January index of 259, and exceeding by 126 per cent the 116 recorded for February, 1940. The December and November indices were 208 and 173, respectively. Average index for the first two months of 1940 was 260½, as compared with an average of 119½ for the corresponding period of 1940, and 122½ in the same months of 1929.



MARVEL 9A
(capacity 10" x 10")
Cutting-off shafts at the
Monarch Machine Tool Co.



Fine Machine Tool Builders Know Their Machine Tools!

• When the Monarch Machine Tool Co., builders of Monarch Precision Lathes, needed another cutting-off machine, they chose a MARVEL 9A Production Saw . . . one of MARVELS new heavy-duty, all-ball-bearing sawing machines with automatic bar push up. These are the fastest saws built—will cut-off more pieces, floor-to-floor, from single or nested bars than can be cut-off by any other method.

ARMSTRONG-BLUM MANUFACTURING CO.
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MARVEL SAWS

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

Price differentials on iron and steel scrap for geographical districts and for various grades probably will be announced by the Price Stabilization Division of the National Defense Commission within a week. The division is concerning itself with the supply of scrap as well as prices. While as yet there is no widespread evidence of hoarding, some small holders have been reluctant to sell their stocks. Should scrap shortages occur, the Price Stabilization Division will, if necessary resort to requisitioning of available supplies, which can be done legally through use of the emergency powers that have been granted to the Army and Navy.

While few price changes have occured in steel grades, there have been increases on cast scrap almost everywhere. The average price for No. 1 cast is 50c. higher both at Pittsburgh and Chicago, at $23.25 and $21.25, showing an advance of $1 and $2 respectively over the prices four weeks ago. Markets in most districts are unsettled and anxious to hear the outcome of negotiations which are being conducted in Washington. "Scrap bootlegging" is foreseen in a few centers unless the present situation is cleared up soon and effectively.

Several large consumers are looking farther afield for the collection of materials. A Buffalo mill is said to have bought 10,000 tons of material at an upper Lake port to be moved when navigation can be resumed and from Birmingham comes the report that Pittsburgh is taking large tonnages of scrap by barge from New Orleans. Pittsburgh reiterates the claim that it must reach out for material farther than other consuming centers and therefore must have a suitable price differential. Prices for primary steel grades are unchanged and THE IRON AGE composite price remains at $20.33.

Pittsburgh

This district finds itself practically in a vacuum as far as outside supplies of scrap are concerned. Consumption orders for No. 1 steel taken at $21 a ton several weeks ago are still less than half filled and coverages to date have, in the majority of cases, been made by brokers at the same figure which they obtained. Because other district prices on primary grades of scrap are within 50c. or $1 a ton of prices quoted here, Pittsburgh is practically cut off from supplies emanating from more than 100 miles from the East, Middle West, North and South and Southwest. Prices at distant locations are at a point where freight costs would bring the delivered price at Pittsburgh to a figure higher than $21 a ton, the suggested Washington quotation for No. 1 steel.

Philadelphia

Although the flow of scrap to district mills is not adequate, it has not been reduced further and both buyers and sellers have hopes that it will be increased soon. Mills are dipping into stockpiles in a moderate way to supplement shipments. Cast grades continue to cause most concern, recent sales reflecting higher values. Mixed yard cast is quoted this week at $22.50 to $23, and No. 1 blast furnace at $14 to $14.50. Specialties are up to $26.50 to $27.

Chicago

Despite a hectic and thoroughly unsettled market, prices moved little in the past week. Some action in cast iron borings took place, sending that price upward. Reports on No. 1 heavy melting steel are conflicting. It is definitely known that certain stocks have been dipped into consistently for several weeks. However, market interests are disposed to wait for official action from Washington.

Youngstown

Mills here continued during the past week their vigorous drive to obtain delivery on outstanding orders. Principal quotations are unchanged this week.

Cleveland

Principal quotations are unchanged here this week, awaiting the announcement of the new differentials from Washington. Final recommendations were drawn up by the local committee Sunday and submitted to the Cleveland chapter Monday night. Meanwhile the situation on cast scrap has been growing tighter here. At least two foundries became seriously concerned over shortages of cast scrap last week. Rationing may become a necessity, it is said.

Buffalo

Purchase outside the local district of about 10,000 tons of all grades of scrap by the district's largest consumer was reported this week. Delivery will be by boat from the upper Lake region as soon as navigation opens. There is talk here that the Pittsburgh base price on scrap, if differentials go into effect, will be $21 a ton instead of $20 so that the Buffalo price would be $20.33 rather than $19.33. Cast iron carwheels are up $1 here this week.

St. Louis

Melting steel grades were again unchanged in St. Louis, but most other items were up 50c. a ton. Dealers and brokers transactions are negligible as a result of uncertainties over the proposed differentials. The St. Louis chapter of the institute has taken no action as yet on the differentials, but members say that the plan as proposed would divert scrap to other markets and work a hardship on interests here. Foundry grades are especially strong.

Cincinnati

With old material dealers trying to learn new rules, which as yet have not been definitely set, the market psychology is confused. Available material is not plentiful. Dealers generally express opinion that prices are not keeping material from the market, but that demand has arrived at such a place that scrap is being sold almost as rapidly as collected, with some indication of strictures in the more popular grades.

Birmingham

No. 1 and No. 2 cast grades and rails for rolling have advanced $1 a ton here, the first price change in this district in several weeks. Accumulations on dealers' yards have decreased and the advances result from mounting demand and pig iron shortages. Considerable tonnages of scrap, it is reported here, are being moved from New Orleans to Pittsburgh by barge.

Detroit

The anticipation of enforced price ceilings has been an important contributing factor to a leveling off in activity and prices in the Detroit scrap market. Without it dealers and brokers aver activity would be much greater and prices quoted probably would be a dollar above today's levels. One bidder on an automotive list last week said that prices which "stayed within government ideas on price" missed the mark in every case. Included in comments are several allegations that a rise of scrap "bootlegging" may result if unbalanced conditions are introduced in the market.

New York

The strength of this market in cast scrap has now advanced prices for delivery at local foundries. Thus No. 1 machinery cast delivered, previously quoted at $21 to $22, has seen yields as high as $23. No. 2 cast delivered is raised 50c. to $18.50 to $19. Some transactions in secondary steel grades have taken place at prices above the general market. On March 18, 18,000 tons of scrap and 2000 tons of rails of the Brooklyn Fifth Avenue and Fulton Avenue Elevated were auctioned to demolishers. Prices realized were not known at press time. Prices for truck lots delivered barges, although reported under export, do not necessarily refer to export shipments, as some scrap is being moved by barge.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$21.00
Railroad heavy mltng.	$21.00 to 21.50
No. 2 heavy melting...	20.00
Railroad scrap rails...	22.00 to 22.50
Rails 2 ft. and under..	26.50 to 27.00
Comp. sheet steel.....	21.00
Hand bundled sheets..	20.00
Heavy steel axle turn.	20.00 to 21.00
Heavy steel forge turn.	19.00 to 20.00
Machine shop turnings	16.00 to 16.50
Short shov. turn. alloy free	17.00 to 17.50
Mixed bor. & turn.....	17.00 to 17.50
Cast iron borings.....	17.50 to 18.00
Cast iron carwheels...	23.00 to 23.50
Heavy breakable cast.	19.50 to 20.00
No. 1 cupola cast.....	23.00 to 23.50
RR. knuckles & coup.	25.50 to 26.00
Rail coil springs	26.50 to 27.00
Rail leaf springs	26.50 to 27.00
Rolled steel wheels....	26.50 to 27.00
Low phos. billet crops.	26.50 to 27.00
Low phos. punchings.	26.50 to 27.00
Low phos. heavy plate.	25.50 to 26.00
Railroad malleable ...	26.00 to 26.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.00
No. 2 hvy. mltng. steel.	19.00
Hydraulic bund., new.	20.00
Hydraulic bund., old..	$17.50 to 18.00
Steel rails for rolling..	23.50
Cast iron carwheels..	23.00
Hvy. breakable cast..	23.00 to 23.50
No. 1 cupola cast	24.00 to 25.00
Mixed yard (f d'y) cast	22.50 to 23.00
Stove plate (steel wks.)	20.00 to 20.50
Railroad malleable ...	23.50 to 24.00
Machine shop turn....	15.00 to 15.50
No. 1 blast furnace....	14.50 to 15.00
Cast borings	17.00 to 17.50
Heavy axle turnings..	19.50 to 20.00
No. 1 low phos. hvy...	26.50 to 27.00
Couplers & knuckles..	26.50 to 27.00
Rolled steel wheels....	26.50 to 27.00
Steel axles	25.00 to 25.50
Shafting	25.00 to 25.50
Spec. iron & steel pipe	18.00 to 18.50
Cast borings (chem.)..	17.50 to 18.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel.....	$20.00
Auto. hvy. mltng. steel alloy free	$18.50 to 19.00
No. 2 auto. steel.....	16.50 to 17.00
Shoveling steel	19.50 to 20.00
Factory bundles	19.00 to 19.50
Dealers' bundles	18.00 to 18.50
No. 1 busheling	18.50 to 19.00
No. 2 busheling, old...	10.50 to 11.00
Rolled carwheels	22.50 to 23.00
Railroad tires, cut	23.00 to 23.50
Railroad leaf springs..	22.50 to 23.00
Steel coup. & knuckles	22.50 to 23.00
Axle turnings	18.75 to 19.25
Coil springs	24.00 to 24.50
Axle turn. (elec.).....	19.75 to 20.00
Low phos. punchings..	23.00 to 23.50
Low phos. plates 12 in. and under	23.25 to 23.75
Cast iron borings.....	15.50 to 16.00
Short shov. turn.....	15.50 to 16.00
Machine shop turn....	13.75 to 14.25
Rerolling rails	24.00 to 24.50
Steel rails under 3 ft..	23.50 to 24.00
Steel rails under 2 ft..	24.50 to 25.00
Angle bars steel	23.00 to 23.50
Cast iron carwheels...	20.00 to 20.50
Railroad malleable ...	24.50 to 25.00
Agric. malleable	17.50 to 18.00
	Per Net Ton
Iron car axles	$23.50 to $24.00
Steel car axles	25.50 to 26.00
Locomotive tires	18.00 to 18.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast..	21.00 to 21.50
Clean auto. blocks....	19.50 to 20.00
No. 1 railroad cast....	17.75 to 18.25
No. 1 agric. cast.....	16.50 to 17.00
Stove plate	14.50 to 15.00
Grate bars	14.00 to 14.50
Brake shoes	15.00 to 15.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.50 to $21.50
No. 2 hvy. mltng. steel	19.25 to 20.25
Low phos plate	24.00 to 24.50
No. 1 busheling	20.00 to 20.50
Hydraulic bundles	20.25 to 21.25
Machine shop turn.....	15.50 to 16.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.00 to $21.00
No. 2 hvy. mltng. steel.	19.00 to 20.00
Comp. sheet steel	$19.50 to $20.50
Light bund. stampings	15.00 to 15.50
Drop forge flashings...	19.00 to 19.50
Machine shop turn....	13.50 to 14.00
Short shov. turn.....	16.25 to 16.75
No. 1 busheling	19.25 to 19.75
Steel axle turnings...	19.50 to 20.00
Low phos. billet and bloom crops	24.50 to 25.00
Cast iron borings.....	16.25 to 16.75
Mixed bor. & turn.....	16.25 to 16.75
No. 2 busheling*	15.00 to 15.50
No. 1 machinery cast.	24.00 to 24.50
Railroad cast	23.50 to 24.00
Railroad grate bars ...	15.00 to 15.50
Stove plate	15.00 to 15.50
Short rails, 2 ft. length	26.75 to 27.25
Rails for rolling	25.50 to 26.00
Railroad malleable ...	24.50 to 25.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$21.00 to $21.50
No. 2 hvy. mltng. steel.	19.00 to 19.50
Scrap rails	22.00 to 22.50
New hvy. b'ndled sheets	19.00 to 19.50
Old hydraul. bundles..	17.50 to 18.00
Drop forge flashings...	19.00 to 19.50
No. 1 busheling	19.00 to 19.50
Machine shop turn....	13.50 to 14.00
Shov. turnings	16.00 to 16.50
Mixed bor. & turn....	14.50 to 15.00
Cast iron borings.....	14.50 to 15.00
Knuckles & couplers..	25.00 to 25.50
Coil & leaf springs....	25.00 to 25.50
Rolled steel wheels...	25.00 to 25.50
No. 1 machinery cast..	22.50 to 23.00
No. 1 cupola cast.....	21.00 to 21.50
Stove plate	18.00 to 18.50
Steel rails under 3 ft..	27.00 to 27.50
Cast iron carwheels...	21.50 to 22.50
Railroad malleable ...	24.00 to 24.50
Low phos. plate	26.50 to 27.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$18.00 to $18.50
No. 1 hvy. melting....	17.50 to 18.00
No. 2 hvy. melting....	16.50 to 17.00
No. 1 locomotive tires..	20.00 to 20.50
Misc. stand. sec. rails..	20.00 to 20.50
Railroad springs	22.00 to 22.50
Bundled sheets	13.00 to 13.50
Cast bor. & turn.....	10.50 to 11.00
Machine shop turn	11.00 to 11.50
Heavy turnings	14.00 to 14.50
Rails for rerolling	21.50 to 22.00
Steel car axles	25.50 to 26.00
No. 1 RR wrought.....	14.25 to 14.75
No. 2 RR. wrought....	16.50 to 17.00
Steel rails under 3 ft...	24.00 to 24.50
Steel angle bars	21.50 to 22.00
Cast iron carwheels...	21.50 to 22.00
No. 1 machinery cast..	20.00 to 20.50
Railroad malleable ...	20.50 to 21.50
Breakable cast	18.00 to 18.50
Stove plate	15.50 to 16.00
Grate bars	14.50 to 15.00
Brake shoes	14.50 to 15.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$18.25 to $18.75
No. 2 hvy. mltng. steel.	16.25 to 16.75
Scrap rails for mltng.	23.25 to 23.75
Loose sheet clippings.	12.75 to 13.25
Hyd'lic bundled sheets	17.00 to 17.50
Cast iron borings	9.25 to 9.75
Machine shop turn....	10.00 to 10.50
No. 1 busheling	14.25 to 14.75
No. 2 busheling	7.75 to 8.25
Rails for rolling	24.50 to 25.00
No. 1 locomotive tires.	20.25 to 20.75
Short rails	26.25 to 26.75
Cast iron carwheels..	18.75 to 19.25
No. 1 machinery cast..	22.25 to 22.75
No. 1 railroad cast...	20.50 to 21.00
Burnt cast	12.75 to 13.25
Stove plate	12.75 to 13.25
Agricul. malleable	18.00 to 18.50
Railroad malleable ...	21.00 to 21.50
Mixed hvy. cast.	19.25 to 19.75

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$18.00
No. 2 hvy. melting steel	17.00
No. 1 busheling	16.00
Scrap steel rails	18.00
Steel rails under 3 ft..	20.00
Rails for rolling	20.00
Long turnings	9.50
Cast iron borings	8.50
Stove plate	13.50
Steel axles	18.00
No. 1 RR. wrought....	16.00
No. 1 cast	19.50
No. 2 cast	14.50
Cast iron carwheels...	19.00
Steel carwheels	18.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting..	$16.50 to $17.00
No. 2 heavy melting..	15.50 to 16.00
Borings and turnings.	12.50 to 13.00
Machine shop turnings.	11.50 to 12.00
Long turnings	10.00 to 10.50
Short shov. turnings..	13.00 to 13.50
No. 1 cast	20.00 to 20.50
Automotive cast	21.00 to 21.50
Hvy. breakable cast...	18.00 to 18.50
Stove plate	13.00 to 13.50
Hydraul. comp. sheets.	17.75 to 18.25
New busheling	16.50 to 17.00
Sheet clips	13.75 to 14.25
Flashings	16.50 to 17.00
Low phos. plate	19.00 to 19.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$16.50
No. 2 hvy. mltng. steel	$15.00 to 15.50
Hvy. breakable cast...	18.50 to 19.00
No. 1 machinery cast.	19.00 to 19.50
No. 2 cast	17.50 to 18.00
Stove plate	15.50 to 16.00
Steel car axles	23.50 to 24.00
Shafting	20.00 to 20.50
No. 1 RR wrought....	17.50 to 18.00
No. 1 wrought long....	17.00 to 17.50
Spec. iron & steel pipe	13.00 to 13.50
Rails for rolling.....	19.50 to 20.00
Clean steel turnings*.	10.00 to 10.50
Cast borings*	11.00 to 11.50
No. 1 blast furnace...	9.00 to 9.50
Cast borings (chem.)..	11.00 to 11.50
Unprepared yard scrap	9.50 to 10.00
Light iron	7.00 to 7.50
Per gross ton delivered local foundries:	
No. 1 machin. cast.....	$21.00 to $23.00
No. 2 cast	18.50 to 19.00

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

Breakable cast	$17.00 to $17.25
Machine shop turn....	9.75 to 10.00
Mixed bor. & turn....	9.50 to 9.75
Bun. skeleton long.....	13.25 to 13.50
Shafting	19.25 to 19.50
Stove plate	14.00 to 14.25
Cast bor. chemical....	11.00 to 11.25
Per gross ton delivered consumers' yards:	
Textile cast	$22.00 to $24.50
No. 1 machine cast....	22.00 to 24.00
Per gross ton delivered dealers' yards:	
Unprepared yard scrap.	$11.00 to $12.15

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	Nominal		
No. 2 hvy. mltng. steel			
Bundles			

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel.....	$14.00	$13.50
Specialty steel	15.00	14.50
No. 1 heavy mltng. steel	12.50	12.00
No. 2 heavy mltng steel	10.50	10.00
Mixed dealers' steel....	9.50	9.00
Drop forge flashings....	10.50	10.00
New loose clippings....	8.75	8.25
Busheling	7.50	7.00
Scrap pipe	8.75	8.25
Steel turnings	9.00	8.50
Cast borings	9.00	8.50
Machinery cast	24.75	24.00
Dealers' cast	22.50	22.00
Stove plate	19.50	19.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered barges	
No. 1 hvy. mltng. steel.	$16.50
No. 2 hvy. mltng. steel.	15.50
No. 2 cast	19.00
Stove plate	17.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.	$17.25
No. 2 hvy. mltng. steel	15.75
Rail (scrap)	$17.25 to 17.50

* Due to a printer's error No. 2 busheling at Cleveland was quoted last week at $23.50 to $24.00; it should have read $15.00 to $15.50.

Construction Steel

. . .STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings declined to 25,100 tons from 35,750 tons last week; new projects higher at 28,725 tons against 18,250 tons a week ago; plate awards call for 1250 tons.

AWARDS

NORTH ATLANTIC STATES

6000 Tons, New York, curb angles, to Phoenix Bridge Co., Phoenixville, Pa.

1500 Tons, Chester, Pa., crane and shipways for Sun Shipbuilding Co., to Belmont Iron Works, Philadelphia.

1400 Tons, Washington, Ninth Street bridge, to Bethlehem Steel Co., Bethlehem, Pa.

1200 Tons, Philadelphia, crane runways for Drydock Associates, to American Bridge Co., Pittsburgh.

775 Tons, Philadelphia, boiler house, quartermaster depot, for War Department, to Bethlehem Steel Co., Bethlehem, Pa.

750 Tons, Devon, Conn., generating station extension, Connecticut Light & Power Co., to Bethlehem Steel Co., Bethlehem, Pa.

725 Tons, Baltimore, drydock wings, to Bethlehem Steel Co., Bethlehem, Pa.

635 Tons, New Milford, Conn., buildings for Maggi Co., to Lehigh Structural Steel Co., Allentown, Pa.

630 Tons, Ithaca, N. Y., Olin Hall, Cornell University, to F. L. Heughes & Co., Rochester, N. Y.

600 Tons, Niagara Falls, furnace building extension for Electro Metallurgical Co., to Lackawanna Steel Construction Corp., Buffalo.

600 Tons, Buffalo, plant addition, Sterling Engine Co., to Buffalo Structural Steel Corp., Buffalo.

550 Tons, Burlington, N. J., building for Public Service Electric & Gas Co., to Lehigh Structural Steel Co., Allentown, Pa.

350 Tons, New Haven, Conn., bridge No. 2.55 for New York, New Haven & Hartford Railroad Co., to American Bridge Co., Pittsburgh.

325 Tons, Camden, N. J., warehouse building, New York Shipbuilding Corp., 207 tons to Lehigh Structural Steel Co., Allentown, Pa., 211 tons to Bethlehem Steel Co., Betthlehem, Pa.

300 Tons, Buffalo, office building for National Gypsum Co., to Buffalo Structural Steel Corp., Buffalo.

200 Tons, Elmira, N. Y., new Lehr building and building addition for Thatcher Mfg. Co., to American Bridge Co., Pittsburgh.

170 Tons, Long Island City, N. Y., warehouse for Owens-Illinois Glass Co., to Belmont Iron Works, Philadelphia.

165 Tons, Reading, building, Reading Sheet Metal Products Co., to Reading Steel Products Co.

THE SOUTH

400 Tons, Mobile, Ala., building for Aluminum Co. of America, to Ingalls Iron Works Co., Pittsburgh plant.

363 Tons, Baytown, Tex., Humble Oil & Refining Co., to Patterson Steel Co., Tulsa, Okla.

340 Tons, Clarksburg, W. Va., building for Pittsburgh Plate Glass Co., to International Steel & Iron Co., Evansville, Ind.

CENTRAL STATES

2000 Tons, Chicago, unit No. 15, Fisk Street station for Commonwealth Edison Co., to Bethlehem Steel Co., Bethlehem, Pa

1500 Tons, Cleveland, building for Cleveland Graphite Bronze Co., to Truscon Steel Co., Youngstown.

800 Tons, St. Louis, Continental Can Co. factory, to Joseph T. Ryerson & Son, Inc., Chicago, through Austin Co., general contractor.

800 Tons, St. Paul, Minn., Reserve Street bridge, to Bethlehem Steel Co., Bethlehem, Pa.

600 Tons, Weldon Springs, Mo., ammunition plant, to Bethlehem Steel Co., Bethlehem, Pa., through Frazer-Brace Engineering Co.

435 Tons, Toledo, building for Spicer Mfg. Co., to Whitehead & Kales Co., Detroit.

343 Tons, Cudahy, Wis., armory, Wisconsin National Guard Airport, to Worden-Allen Co., Milwaukee.

160 Tons, Cloquet, Minn., alterations, dryer building, for Wood Conversion Co., to American Bridge Co., Pittsburgh.

130 Tons, Rittman, Ohio, Ohio Boxboard building, to Republic Structural Iron Works, Cleveland.

WESTERN STATES

350 Tons, Permanente, Cal., magnesium plant, to Bethlehem Steel Co., San Francisco.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

2300 Tons, Tonawanda Township, N. Y., addition to Charles R. Huntley steam plant of Buffalo-Niagara Electric Corp.; bids in.

1200 Tons, Far Rockaway, N. Y., Nameoke Avenue bridge, contract No. 6 for Long Island Railroad Co.

640 Tons, Queens, N. Y., Grand Central Parkway bridge, 23rd Avenue.

400 Tons, Buffalo, addition for American Magnesium Corp. (plans revised).

390 Tons, Maplewood, N. J., laboratory building for Public Service Electric & Gas Co.

370 Tons, Bridgeport, Conn., extension to yard crane for Bullard Co.

350 Tons, Rochester, N. Y., plant for General Motors Corp.

300 Tons, East Hartford, Conn., building for Coca-Cola Bottling Co.

210 Tons, Ozone Park, N. Y., sewage works.

200 Tons, Amherst Township, N. Y., theater and store block for Guelich & Boebel Co.; bids in.

200 Tons, Hartford, Conn., two State bridges, Front Street.

150 Tons, Dunkirk, N. Y., addition for Allegheny Ludlum Steel Corp., bids in.

150 Tons, Clifton, N. J., additions, erection shop and shovel plant for Magor Car Corp.

140 Tons, Lackawanna, N. Y., yard tracks, bridge L-264 for New York Central Railroad Co.

110 Tons, Allegheny County, Pa., highway bridge; bids March 20.

THE SOUTH

10,000 Tons, Atlanta, Ga., government warehouses; bids in.

350 Tons, Lenoir City, Tenn., conveyor bridges, etc., Fort Loudon dam, for TVA.

300 Tons, State of Oklahoma, three highway bridges; bids April 15.

CENTRAL STATES

1000 Tons, Bucyrus, Ohio, fluorescent lamp plant, three buildings, for General Electric Co.

900 Tons, Eau Claire, Wis., State bridge FAP-381-C (3).

750 Tons, Essexville, Mich., extension to J. C. Weadock plant, for Consumers Power Co.

625 Tons, Chicago, girder renewal, 63rd Street, for Chicago Rapid Transit Co.

500 Tons, Wood River, Ill., power plant for Standard Oil Co. of Indiana.

400 Tons, Cleveland, building for Steel & Tubes Division, Republic Steel Corp.; bids March 21.

400 Tons, Janesville, Wis., State bridge FAP-450-C (1).

325 Tons, Rock Island, Ill., factory building, Rock Island Arsenal, for Government.

180 Tons, Columbus, Ohio, oil storage house and truck garage for Curtiss-Wright Corp.

170 Tons, South Holland, Ill., State bridge, route No. 53, section No. 539-SF.

130 Tons, Smithboro, Ill., State bridge, route FA-12, section Q-1-VF.

120 Tons, Springfield, Ill., State bridge FA-161, section No. 3-VF.

110 Tons, Vincennes, Ind., railroad bridge No. 2418.

WESTERN STATES

2500 Tons, San Diego, Cal., transit shed, Naval Air Station for Navy.

1100 Tons, Los Angeles, Slauson Avenue bridge for U. S. Engineers.

660 Tons, Hermiston, Ore., doors and frames for Government.

610 Tons, Los Angeles, bearing piles for Los Angeles River improvement, Arroyo Seco to North Broadway (Invitation 112); bids April 7.

245 Tons, Long Beach, Cal., material for bulkhead at Pier D (Specification HD-109-A); bids March 19. Previous bids rejected.

240 Tons, Pando, Colo., State bridge FAGH-182-E (1).

137 Tons, Pleasanton, Cal., County bridge; bids April 1.

103 Tons, Eagle County, Colo., overpass; bids in.

Weekly Bookings of Construction Steel

Week Ended ——→	Mar. 18, 1941	Mar. 11, 1941	Feb. 18, 1941	Mar. 19, 1940	Year to Date 1941	Year to Date 1940
Fabricated structural steel awards	25,100	35,750	23,850	13,750	358,875	188,060
Fabricated plate awards	1,250	5,100	850	1,905	32,655	30,765
Steel sheet piling awards	100	475	0	970	5,215	8,290
Reinforcing bar awards	24,150	10,200	6,050	14,250	128,040	90,670
Total Letting of Construction Steel	50,600	51,525	30,750	30,875	524,785	317,785

FABRICATED PLATES

AWARDS

1250 Tons, Washington, pipe, to Alco Products Co., Dunkirk, N. Y.

PENDING PROJECTS

600 Tons, Cleveland, city pipe requirements; bids March 21.

400 Tons, Phoenix, Ariz., elevated water tank; bids in.

400 Tons, Moscow, Idaho, elevated water tank; bids March 24.

230 Tons, Oroville, Cal., Pulga and Cresta tunnel liners; bids March 28.

220 Tons, Redding, Cal., floor plates, etc., Pit River bridge, for Bureau of Reclamation.

SHEET PILING

AWARDS

100 Tons, Coatesville, Pa., Lukens Steel Co., to Bethlehem Steel Co., Bethlehem, Pa., through Arthur G. McKee & Co., Cleveland.

Reinforcing Steel

Awards of 24,150 tons; 9,325 tons in new projects.

AWARDS

ATLANTIC STATES

700 Tons, Harrison, N. J., Otis Elevator Co., to Truscon Steel Co., Youngstown, through Walter Kidde Co.

500 Tons, New Haven, Conn., housing project, to Capitol Steel Corp., New York, through LaSalla Mason Co.

SOUTH AND CENTRAL

15,000 Tons, Krotz Springs, La., Morganza River floodway bridge; 4000 tons to Laclede Steel Co., St. Louis, and 11,000 tons to Sheffield Steel Co., Kansas City, Mo., through T. L. James & Co.

2400 Tons, Franklin County, Ohio, Curtiss-Wright Corp. buildings; divided between Jones & Laughlin Steel Corp., Pittsburgh, and Rollak Steel Co., Cincinnati; Darin & Armstrong, contractor.

1500 Tons, Milan, Tenn., Wolfe Creek ordnance plant, to Truscon Steel Co., Youngstown, through Ferguson-Oman Co.

1330 Tons, Lockland, Ohio, Wright Aeronautical test cells, to Truscon Steel Co., Youngstown, through Mahoney Troast Construction Co.

1300 Tons, St. Louis, Carr Street housing project, to Sheffield Steel Corp., Kansas City, through Dunn Construction Co., Kansas City, general contractor.

400 Tons, Chicago, Florsheim Shoe Co. addition, to Inland Steel Co., Chicago.

325 Tons, Chicago, United Drug Co. warehouse, to Inland Steel Co., Chicago; E. W. Sproul, contractor.

300 Tons, St. Louis, Continental Can Co., factory, to Laclede Steel Co., St. Louis, through Austin Co., general contractor.

236 Tons, Cleveland, buildings for Upson Bolt & Nut division of Republic Steel Corp., to Truscon Steel Co., Youngstown, through Hunkin-Conkey Construction Co., Cleveland.

160 Tons, Minneapolis, Minn., Atkinson Milling Co. building, to Laclede Steel Co., St. Louis; Jones-Hettelsater Co., contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

500 Tons, South Boston, Mass., Navy Yard quay wall extension; Merritt-Chapman & Scott, contractors.

400 Tons, South Boston, government pier; Fitzgerald Construction Co., Boston, contractor.

300 Tons, Connecticut State bridges.

250 Tons, Bristol, R. I., Collins & Aikman Corp. plant.

104 Tons, Hartford County, Conn., bridge, FAP-ZEI; bids taken.

SOUTH AND CENTRAL

1800 Tons, Chicago, airplane parts factory for Buick Motor Co.

245 Tons, Hardin and Union Counties, Ohio, State project No. 4.

200 Tons, Lake County, Ohio, State project No. 12; bids March 25.

200 Tons, Newport News, Va., Newport News Shipbuilding & Dry Dock Co., club house.

140 Tons, Trumbull County, Ohio, State project No. 13; bids March 25.

130 Tons, Chicago, Illinois Bell Telephone addition, Hyde Park Exchange.

100 Tons, State of Oklahoma, three highway bridges; bids April 15.

WESTERN STATES

2634 Tons, Oroville, Cal., Pulga and Cresta tunnels; bids March 28.

2200 Tons, Los Angeles, Los Angeles River improvement from Arroyo Seco to North Broadway (Invitation 112); bids April 7.

354 Tons, Friant, Cal., Central Valley project (Invitation 48,777-A); bids in.

Cast Iron Pipe

Boston has taken bids on 12,000 ft. of 8-in. bell and spigot cement lined spun pipe.

Ecorse Township Committee, Ecorse, Mich., care of Madison L. Brown & Son, 120 Madison Avenue, Detroit, consulting engineers, plans pipe lines for water system and other waterworks installation. Cost about $110,000.

General Purchasing Officer, Panama Canal, Washington, asks bids until March 31 for 9000 ft. of cast iron soil pipe, 958 pipe bends, tees, unions and other fittings; gate and check valves, etc. (Schedule 4913).

Water Supply District No. 3, St. Louis County, Clayton, Mo., plans pipe lines for water system in Oakville School District. Cost about $110,000. Bond issue in that amount has been authorized. It is understood that plans will be prepared by Robert Francis Denny Co., 8004 Bonhomme Street, St. Louis, consulting engineer.

East St. Louis & Interurban Water Co., 513 Missouri Avenue, East St. Louis, Ill., plans new 20-in. line for main water supply from East St. Louis to Belleville; also two new pumping stations and other improvements in system. Cost about $100,000.

Sheridan, Wyo., plans pipe line extensions and improvements in water system. Financing is being arranged through Federal aid.

Board of Public Utilities, Kansas City, Kan., James D. Donovan, manager of production and distribution, plans pipe line extensions in Grandview district, cost about $17,000; also new 8 and 12-in. lines in Fairfax industrial district for main water supply, cost about $16,000. This is part of proposed 1941 expansion and improvements in water system, which also will include new water tower near Thirty-sixth and State Streets, to cost about $62,000.

Murfreesboro, Tenn., plans new main water line from source at Walter Hill, Stones River, to city limits, including filtration plant. Cost about $200,000. Bond issue in that amount has been approved.

Waterville, Wash., has taken bids on 150 tons of 4, 6, 8, and 10-in. pipe.

Pipe Lines

Standard Oil Co. of Indiana, Inc., 910 South Michigan Avenue, Chicago, plans new 6-in. welded steel pipe line from Burlington Junction, Mo., to Des Moines and other points in Iowa, about 115 miles in all, for gasoline transmission. Connection will be made with main Kansas City-Council Bluffs pipe line of company at first noted place. Application has been made for permission to build line through Woodbury County, Iowa. Cost over $1,000,000 with booster pumping stations and other operating facilities.

United Gas Pipe Line Co., Baton Rouge, La., plans pressure pipe line system for natural gas distribution at Leesville, La., where 25-year franchise has been secured. Main welded steel pipe line will be built for supply, including control station and meter house in municipality.

Moss Point, Miss., has awarded contract to Boh Brothers Construction Co., 2400 Cypress Street, New Orleans, for pressure pipe line system for municipal natural gas distribution, including main line and local operating facilities, at $62,684. F. P. Joseph, Glenmora, La., is consulting engineer.

Wheatridge Water District, Wheatridge, Colo., Arthur J. Apel, secretary, plans immediate call for bids for about 14 miles of steel pipe for water system, alternate bids on cast iron pipe. Cost about $90,000. Strong & Linn, 516 East Grandview Street, Arvada, Colo., are consulting engineers.

Virginia Electric & Power Co., Richmond, Va., has arranged fund of about $233,000 in 1941 construction budget for extensions and improvements in pipe lines and other facilities for gas distribution system at Norfolk, Va., part of appropriation to be used for additions and improvements in gas plant.

Central Arizona Light & Power Co., Glendale, Ariz., has authorized extensions in pressure pipe system from municipal limits to Southwest Airways training field, about 6.5 miles, for gas transmission.

Department of Hospitals, Frankfort, Ky., plans underground pressure pipe lines for steam distribution at Central State Hospital, Lakeland, Ky. State Construction and Engineering Division, Frankfort, R. C. Wyatt, chief engineer, in charge.

Northwestern Utilities, Ltd., Edmonton, Alta., plans welded steel pipe line from connection with present system at Kinsella to Camrose and Red Deer, Alta., about 100 miles, for natural gas transmission. Cost over $1,200,000 with booster stations and other operating facilities.

Trade Notes . .

Instrument Specialties Co., Inc., formerly at 379 Main Street, Little Falls, N. J., has moved to West Paterson, N. J., at 244-248 Bergen Boulevard. The mail address remains Little Falls, N. J. The entire plant will be used for the manufacture and heat-treatment of springs made only of beryllium copper.

•

Acme Metal Products Corp., Chicago, has bought a group of buildings at Dover, N. J., owned by Richardson & Boynton Co., maker of heating equipment.

•

Tool Equipment Sales Co., 24 South Pulaski Road, Chicago, has been appointed exclusive representative in the Chicago territory for Lempco Products, Inc., makers of grinding machines and straightening presses.

•

The Taylor-Wharton Iron & Steel Co. has recently purchased, for early installation, a new 5-ton Pittsburgh Electromelt Furnace of the latest type top-charging design. This installation is part of the modernization program of their High Bridge, N. J., plant, to increase production of manganese steel and other alloy castings. It also recently added to forging and machining facilities at the Easton, Pa., plant, to augment production of high pressure gas containers and defense material.

•

Cutler-Hammer, Inc., has moved the company's Indianapolis sales office to 241 N. Pennsylvania Street, Room 316. Cutler-Hammer headquarters are in Milwaukee.

•

Philadelphia Drying Machinery Co., 3351 Stokley Street, Philadelphia, announces it will discontinue future business activities and has sold patterns, drawings and engineering data pertaining to its industrial furnace division to Stoler & Curll, Inc., 18th and Cherry Streets, Philadelphia.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / ↓ Product	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG. Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail)[7]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)										
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)								
PILING Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland.	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and smaller by 6 in. and shorter	68
9/16 and ⅝ in. by 6 in. and shorter	66
¾ to 1 in. by 6 in. and shorter	64
1⅛ in. and larger, all lengths	62
All diameters over 6 in. long	62
Lag, all sizes	65
Plow bolts	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	66
9/16 to 1 in. inclusive	63
1⅛ to 1½ in. inclusive	61
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	66	70
9/16 to 1 in.	63	65
1⅛ in. through 1½ in.	61	62
1⅝ in. and larger	60	

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 73 and 100

Stove bolts in packages, with nuts attached 73

Stove bolts in bulk 81

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	68
Upset set screws, cup and oval points	74
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Mar. 12	Mar. 13	Mar. 14	Mar. 15	Mar. 17	Mar. 18
Copper, Electrolytic[1]	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York[2]	51.875	52.00	52.00	....	52.25	52.25
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis[3]	5.60	5.60	5.60	5.60	5.60	5.60

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	53.25	55.00
Copper		
Electro	13.00	14.50
Castings	12.50	13.50
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks	Nom'al	Nom'al
Lead		
American pig	6.75	6.25
Bar	8.60	8.75
Cut sheets	8.90	9.00
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	31.837	32.75
Babbitt		
Anti-friction grade	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from small accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers Selling Prices
Copper		
Hvy. crucible	10.875	11.50
Hvy. and wire	9.875	10.275
Light and bottoms	9.25	9.375
Brass		
Heavy	6.75	7.25
Light	5.75	6.50
No. 1 yel. turn	6.25	6.75
No. 1 red or compo. turnings	9.75	10.75
Hvy. Mach. compo.	10.00	10.225
Lead		
Heavy	5.00	5.50
Aluminum		
Cast	Nom'l	Nom'l
Sheet	Nom'l	Nom'l
Zinc	Nom'l	Nom'l

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 21-23c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $178-179, per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem . . . $54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade	2.70c.
Delivered, Detroit	2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.

Open hearth grade 3.50c

SPEED CASE STEEL

A LOW CARBON OPEN HEARTH PRODUCT

Assures You . . .

1. INCREASED PRODUCTION
40% to 80% Production increase over comparable steels like SAE X1020 or X1314 due to machinability and reduced rejections.

2. MACHINABILITY
Machines as fast as SAE X1112

3. CARBURIZING
Carburizes like SAE X1020

4. PHYSICAL PROPERTIES
Equal to SAE X1020-X1315-1115

5. UNUSUAL DUCTILITY
180° Bend (Cold Drawn - 1" Rd)

6. SMALLER INVENTORY
Due to Versatility of Speed Case

JOBBERS NOTE!
Reduce Your Inventory
SPEED CASE
the ALL PURPOSE Steel
will allow you to reduce the number of different steels you are now carrying in your stock.
ASK US FOR DETAILS

Licensee for Eastern States
THE FITZSIMONS COMPANY
YOUNGSTOWN, OHIO

Licensor
MONARCH STEEL COMPANY
HAMMOND • INDIANAPOLIS • CHICAGO
PECKOVER'S LTD., Toronto, Canadian Distributor

MANUFACTURERS OF COLD DRAWN CARBON AND ALLOY STEEL BARS

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d. 13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb .or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = $200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½
Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+10
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60
Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

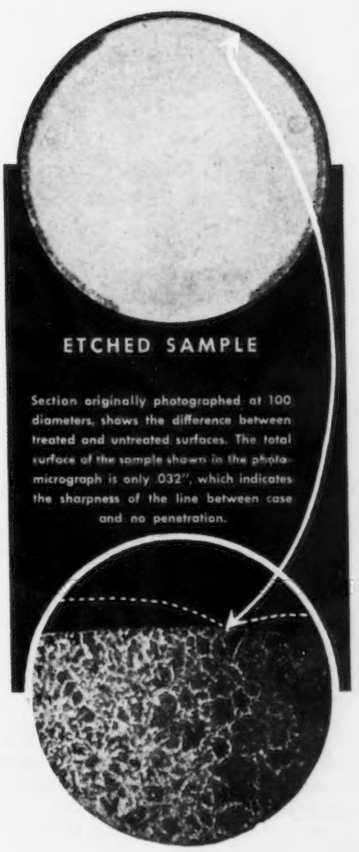
F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

The Modern Accepted Method For Heat Treatment Of Steels

SEL-CAR

Patents Pending

- - Used And Recommended By Steel Producers


ETCHED SAMPLE
Section originally photographed at 100 diameters, shows the difference between treated and untreated surfaces. The total surface of the sample shown in the photomicrograph is only .032", which indicates the sharpness of the line between case and no penetration.

SEL-CAR A for surface protection of steels susceptible to decarburization during heat treatment; prevention of carbon penetration in low carbon steel; selective cyaniding in liquid baths. For use between **1400 and 2350 deg. F.**

SEL-CAR B is recommended for the same uses as Sel-Car A, but is more easily removed after heat treatment.

SEL-CAR C is recommended for coating outside surfaces of annealing and carburizing boxes to prevent scaling and oxidation during heat treatment.

SEL-CAR D is for the heat treatment of steels within the temperature range of **1400 to 1550 deg. F.** Is especially recommended for High Carbon Water Quenched steels as **it positively eliminates all water cracks.**

SEL-CAR G is recommended for selective carburization in cases where grinding, sand or shot blasting is not desirable.

SEL-CAR H is used for the prevention of decarburization on dies having intricate design where a clean surface is imperative. Also readily removable after heat treatment.

Advantages of SEL-CAR

(1) Useful between 1400 and 2350 deg. F.
(2) Eliminate packing of certain steels in spent materials during treatment.
(3) Reduces the necessity of furnace atmosphere control.
(4) Will not attack furnace hearths.
(5) Simply applied—economical—efficient.

SEL-NITE is recommended for the selective nitriding of steels.

Write For Samples And Manual

NATIONAL COPPER PAINT CORP.

GENERAL OFFICES: 110 S. DEARBORN ST., CHICAGO, ILL.

FACTORY — 1760 DIVERSEY PARKWAY, CHICAGO, ILL.

ORES

Lake Superior Ores
Delivered Lower Lake Ports

	Per Gross Ton
Old range, bessemer, 51.50%...	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%	4.60
Mesaba, non-bessemer, 51.50%.	4.45
High phosphorus, 51.50%	4.35

Foreign Ores*
C.i.f. Philadelphia or Baltimore, Exclusive of Duty

	Per Unit
African, Indian, 44 to 48% Mn.	57c. to 61c.
African, Indian, 49 to 51% Mn.	60c. to 65c.
Brazilian, 46 to 48% Mn.	54c. to 59c.
Cuban, del'd, duty free, 51% Mn.	67½c. to 71c.

	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$23 to $24
Tungsten, domestic, scheelite, delivered	$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	Nom.
Rhodesian, 45%	$25.00
Rhodesian, 48%	$28.00 to $30.00

RAILS, TRACK SUPPLIES

F.o.b. Mill	
Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
F.o.b. Basing Points	
Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR *Per Net Ton*

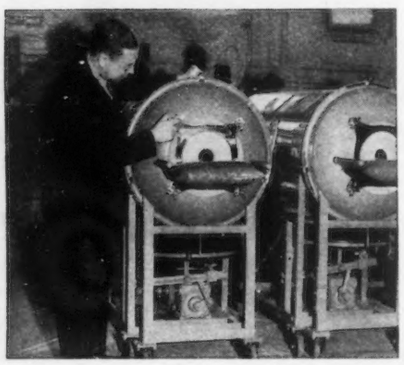
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$20.00 to $21.00
Domestic, f.o.b. Ohio River landing barges	20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick *Per 1000 f.o.b. Works*	
Super-duty brick at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10
Silica Brick	
Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55
Chrome Brick *Net per Ton*	
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	
Magnesite Brick	
Standard f.o.b. Baltimore and Chester	$72.00
Chemically bonded, f.o.b. Baltimore	61.00
Grain Magnesite	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

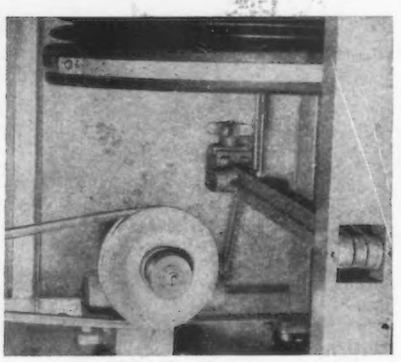
*None available.

"IRON LUNG" IS QUIET, NEVER-FAILING WITH TORRINGTON NEEDLE BEARINGS



1. "Torrington Needle Bearings are used at 4 vital points of the 'Iron Lung' because they can be relied on to run smoothly and silently in continuous service without wear or attention," says Mr. H. P. Roth, of Warren E. Collins, Inc., maker of the famous Drinker-Collins Respirator.

Few machines must be as absolutely dependable as the "Iron Lung." Torrington Needle Bearings are used because they are reliable, quiet and efficient.



2. "Needle Bearings perform admirably day after day, year after year," Mr. Roth adds. "They were adopted after previous bearings gave trouble due to wear, play and noise when in long use. In contrast, the Torrington Needle Bearings, lubricated at the time of installation, require little or no attention throughout the life of the product."

Can you use an anti-friction, self-contained bearing that occupies no more space than a plain bushing? Are high capacity, low initial costs and easy installation important in your product? If so, the Torrington Needle Bearing will interest you. Our Engineering Department will be glad to work with you. For detailed information, write for Catalog No. 104. For Needle Bearings to be used in heavier service, ask our associate, Bantam Bearings Corporation, South Bend, Indiana, for Catalog 103X.

THE TORRINGTON COMPANY, TORRINGTON, CONN., U. S. A. • ESTABLISHED 1866
Makers of Needle and Ball Bearings
New York Boston Philadelphia Detroit Cleveland Chicago London, England

TORRINGTON NEEDLE BEARING

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed..... 87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$28.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium f.o.b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract per net ton.....$157.50

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.....4.00c.
No. 6, f.o.b. Bayonne, N. J.....2.98c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..5.50c.
No. 4 industrial, del'd Cleveland.5.25c.
No. 5 industrial, del'd Cleveland.5.00c.
No. 6 industrial, del'd Cleveland.4.75c.

KINNEAR
ROLLING DOORS
EFFICIENT
AWARDED FOR OUTSTANDING DEPENDABILITY AND LENGTH OF SERVICE . . . FOR PROTECTING THE DOORWAYS OF INDUSTRY AND COMMERCE AGAINST FIRE, THEFT, WIND AND WEATHER . . . AND FOR UNSURPASSED SAVINGS IN SPACE, TIME, AND MONEY
DEPENDABLE
CONVENIENT

FOR DISTINGUISHED SERVICE

This medal is symbolic of Industry's recognition of Kinnear Rolling Door design! Users everywhere have found that Kinnear's all-steel, interlocking-slat construction (originated by Kinnear) is more rugged, longer lasting. By coiling compactly out of the way above the opening, Kinnear Doors save space, open over snow, ice and other obstacles, are more convenient in every way, and reduce repair costs. Equip *your* plant for lower door costs. Write for details.

The KINNEAR Manufacturing Company
1760-80 FIELDS AVENUE COLUMBUS, OHIO
Offices and Agents in Principal Cities
FACTORIES: SAN FRANCISCO, CALIF., COLUMBUS, OHIO

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt ..... $5.25 to $5.75

Foundry, f.o.b. Connellsville, prompt ..... $5.50 to $6.00

F'dry, by-product, Chicago 10.50

F'dry, by-product, New England 13.00

Foundry, by-product, Newark or Jersey City ..... $11.30 to $11.90

F'dry, by-product, Philadelphia. 11.63

F'dry, by-product, Cleveland... 11.55

F'dry, by-product, Cincinnati... 11.00

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.. .... $14.75

BRITISH

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export £29 16s. 3d.

Tin plate, per base box. 32s. to 33s.

Steel bars, open hearth ..£16 10s.

Beams, open hearth....£15 10s.

Channels, open hearth...£15 10s.

Angles, open hearth....£15 10s.

Black sheets, No. 24, gage £22 5s. max.* £22 5s. min.**

Galvanized sheets, No. 24 gage £25 12s. 6d. max.*; £25 12s. 6d. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$25.50***	***$25.00***	***$26.50***	***$26.00***	.....
Brooklyn	***27.50***	.....	.....	***28.00***	.....
Jersey City	***26.53***	***26.03***	***27.53***	***27.03***	.....
Philadelphia	***25.84***	***25.34***	***26.84***	***26.34***	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....
Steelton, Pa.	.....	24.50	.....	.....	29.50
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50
Sparrows Point, Md.	25.00	24.50	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....
Sharpsville, Pa.††	24.00	23.50	24.50	24.00	.....
Buffalo	24.00	23.00	25.00	24.50	29.50
Cincinnati	***24.44***	***24.61***	.....	***25.11***	.....
Canton, Ohio	***25.39***	***24.89***	***25.89***	***25.39***	.....
Mansfield, Ohio	***25.94***	***25.44***	***26.44***	***25.94***	.....
St. Louis	***24.50***	***24.02***	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....
Cleveland	24.00	23.50	24.50	24.00	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....
Toledo	24.00	23.50	24.50	24.00	.....
Youngstown††	24.00	23.50	24.50	24.00	.....
Detroit	24.00	23.50	24.50	24.00	.....
St. Paul	***26.63***	.....	***27.13***	***26.63***	.....
Duluth	24.50	.....	25.00	24.50	.....
Birmingham	20.38	19.00	25.00	.....	.....
Los Angeles, San Francisco and Seattle	***27.50***	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	.....	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$23.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

††Pittsburgh Coke & Iron and Struthers furnaces are quoting $24.50 a ton for No. 2 foundry, basic and malleable, and $25.00 a ton for bessemer iron at Sharpsville and Youngstown.

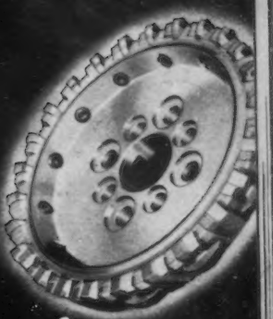
WAREHOUSE PRICES

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.05	$3.35	$3.75	$3.58	$3.23	$3.25	$3.71	$3.45	$3.39	$3.30	$3.38	$4.30
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	3.68	....	4.12	4.35	4.23	6.50
Sheets, galvanized	4.75	4.60	4.62	4.90	5.00	4.64	4.75	5.11	4.75	4.87	4.75	4.98	5.25
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.48*	3.82	4.06	3.70	3.74	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.22	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.35	3.69	3.80	3.68	4.15
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.15
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.55	7.31	7.60	7.42	7.35	7.50	....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.40	8.56	8.84	8.45	8.40	8.63	....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.

Precision COUNTERBORES

Precision BORING MACHINES



Precision CUTTING TOOLS

Precision HYDRAULIC POWER UNITS

IF IT'S *Precision* YOU NEED!

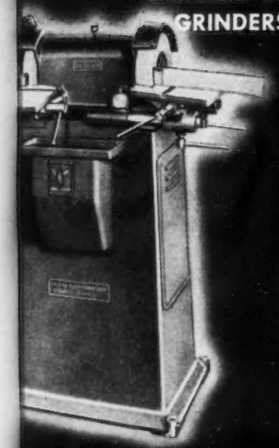
. . . EVERY EX-CELL-O PRODUCT REPRESENTS THE HIGHEST *Precision* PERFORMANCE IN THE MACHINE TOOL INDUSTRY

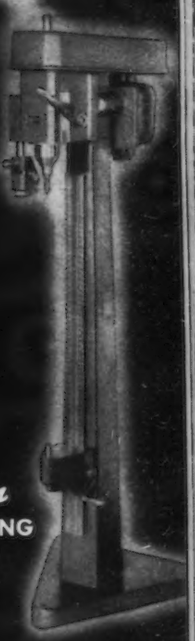
FROM the day of its organization, Ex-Cell-O has maintained only one standard in the designing and the making of any machine, tool, or part bearing the Ex-Cell-O name—*the greatest degree of accuracy that progressive engineering, skilled craftsmanship, and modern factory methods and facilities can produce* . . . this is why it will definitely pay you—if you have any need or problem in the metal-working fields indicated by the *precision* machines and tools shown here—to get in touch with Ex-Cell-O.

EX-CELL-O CORPORATION - DETROIT, MICH.

Precision THREAD GRINDERS

Precision CARBIDE TOOL GRINDERS

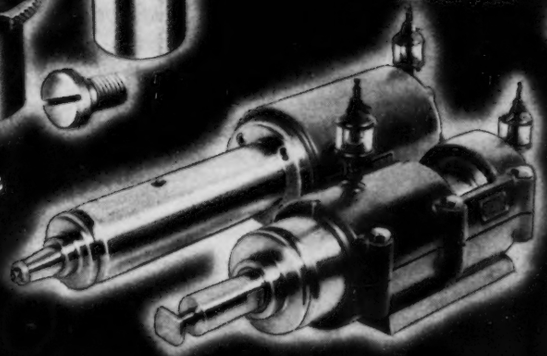




Precision DRILL JIG BUSHINGS

Precision INTERNAL LAPPING MACHINES

Precision BROACHES



Precision GRINDING SPINDLES

Precision CENTER LAPPING MACHINES

EX-CELL-O *Precision* MACHINES AND TOOLS

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1210 Oakman Blvd., Detroit, Mich.

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Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

●**Scovill Mfg. Co., Inc.,** Mill Street, Waterbury, Conn., brass, bronze and other metal tubing, wire and allied products, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for two one-story additions to buildings Nos. 72 and 101. Cost close to $275,000 with equipment.

Bristol Mfg. Corp., Bristol, R. I., rubber goods, has arranged with City Council, Fall River, Mass., for purchase of one-story mill, formerly used for textile manufacture, and will remodel for new plant. Cost over $50,000 with equipment.

Warren Telechron Co., Ashland, Mass., electric clocks, parts, etc., has let general contract to J. W. Bishop Co., 109 Foster Street, Worcester, Mass., for one-story addition, 50 x 100 ft. Cost close to $50,000 with equipment. Fay, Spofford & Thorndike, 11 Beacon Street, Boston, are engineers.

United States Engineer Office, Providence, R. I., asks bids until March 25 for pumping machinery and accessory equipment for new pumping station at West Springfield, Mass., forming part of flood control for Connecticut River basin. Bids also are being asked for construction of building.

Florence Stove Co., Gardner, Mass., has let contract to Austin Co., Cleveland, for one-story addition, 150 x 200 ft. Cost over $100,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for portable oil engine-generator sets, with switchgear, instruments and structural housing for Portsmouth, N. H., Navy Yard (Specification 10352).

Robins Dry Dock & Repair Co., Erie Basin, Brooklyn, has filed plans for new one-story forge shop, 100 x 150 ft., at 2-46 Halleck Street. Cost close to $75,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

Universal Atlas Cement Co., 135 East Forty-second Street, New York, has let general contract to Turner Construction Co., 420 Lexington Avenue, for new mill at Northampton, Pa., including storage and distributing units, machine shop, power house and auxiliary structures. Cost close to $5,000,000 with machinery.

Tubize Chatillon Corp., 2 Park Avenue, New York, viscose and acetate rayon products, has approved plans for one and multi-story addition to branch mill at Rome, Va. Cost about $1,450,000, of which over $1,000,000 will be expended for equipment. Erection will be carried out in spring. Robert & Co., Inc., Bona-Allen Building, Atlanta, Ga., is architect and engineer.

Atlantic Basin Iron Works, Inc., 168 Van Brunt Street, Brooklyn, iron, copper and other metal products, has approved plans for extensions and improvements in two-story machine shop. Cost over $50,000 with equipment. Walker & Gillette, 599 Madison Avenue, New York, are architects; Matthew Hiller, Jr., last noted address, is engineer.

Owens-Illinois Distributors, Inc., 405 Lexington Avenue, New York, subsidiary of Owens-Illinois Glass Co., Toledo, Ohio, has filed plans for one-story storage and distributing plant, 176 x 200 ft., at 47-22 Pearson Place, Long Island City. Cost about $120,000 with mechanical-handling, loading and other equipment. John M. Baker, 24-16 Bridge Plaza South, Long Island City, is architect.

Anaconda Wire & Cable Co., 25 Broadway, New York, has let general contract to H. M. Soule, 110 Armistice Boulevard, Pawtucket, R. I., for one-story addition to branch plant at Pawtucket, 45 x 145 ft. Cost over $75,000 with equipment. Monahan & Meikle, 255 Main Street, Pawtucket, are architects.

Bureau of Yards and Docks, Navy Department, Washington, plans extensions and improvements in power plant at naval ammunition depot, Iona Island, N. Y. Cost about $100,000 with equipment.

Spicer Mfg. Corp., 4100 Bennett Road, Toledo, Ohio, universal joints, gears and other automotive equipment, has acquired for its subsidiary, Brown-Lipe Gear Co., same address, plant and assets of General Drop Forge Co., Buffalo, to be operated as unit of Brown-Lipe organization. Plans are under way for expansion in production. Parent company has arranged financing in amount of $1,000,000, of which over $500,000 will be used for plant acquisition and development.

State Department of Education, State Education Building, Albany, N. Y., plans one-story additions to mechanical division at Alfred University, Alfred, N. Y., for metal-working, welding, pattern-making and other shops. Cost about $300,000 with equipment. Department of Architecture, State Office Building, Albany, will prepare plans.

Buffalo Niagara Electric Corp., Electric Building, Buffalo, has arranged financing through sale of bond issue in amount of $7,200,000, of which $6,800,000 will be used for expansion and improvements in plants, system and other operating properties.

Air Associates, Inc., Bendix, N. J., aircraft equipment, plans additions for production of ignition devices for airplane engines and allied equipment for Government. Cost about $2,550,000, fund in that amount to be furnished by Government.

Peter J. Schweitzer, Inc., 994 Newark Avenue, Elizabeth, N. J., carbon and cigarette papers, and other processed paper stocks, has arranged for purchase of former plant of American Salpa Corp., Bordentown-Amboy Turnpike, Spotswood, N. J., totaling over 300,000 sq. ft. of floor space, and will improve for new branch mill, with facilities for employment of about 500 persons.

Eisler Engineering Co., 730 South Sixteenth Street, Newark, N. J., machinery for production of radio tubes, welding apparatus, etc., has let general contract to Frank Franco, 269 Lafayette Street, for one-story and basement addition, about 45 x 90 ft., for expansion in welding machine department. Cost close to $50,000 with equipment. Wolf & Glucksman, 850 Broad Street, are architects.

Western Electric Co., 100 Central Avenue, Kearny, N. J., telephone instruments and apparatus, etc., has leased one-story building on West Grand Avenue, Roselle, N. J., for new factory branch, storage and distributing plant.

Reading Sheet Metal Products Co., Chestnut Street, Reading, Pa., has asked bids on general contract for new one-story plant, 100 x 350 ft. Cost close to $100,000 with equipment. Muhlenberg, Yerkes & Muhlenberg, Gardner Building, are architects.

Chambersburg Engineering Co., Chambersburg, Pa., forging machinery, sheet metal-working equipment, plans one-story addition for production of munitions for Navy Department. Cost about $661,000 with equipment, fund to be furnished by Government.

R. F. Sedgley, Inc., Ontario and J Streets, Philadelphia, military rifles, machine guns, etc., is arranging for purchase of former Stafford Mills, Fall River, Mass., textiles, and will modernize for new branch plant. Cost over $60,000.

General Electric Co., East Lake Road, Erie, Pa., has let general contract to H. Platt Co., 922 Raspberry Street, for one-story addition, 150 x 200 ft. Cost over $100,000 with equipment. Plant is used for production of electric refrigerator cabinets.

Johnstown Coca-Cola Bottling Co., 389 Maple Avenue, Woodvale, Johnstown, Pa., plans new two-story and basement mechanical-bottling, storage and distributing plant on Valley Pike. Cost close to $90,000 with equipment.

Acme Die & Machine Co., Inc., Latrobe, Pa., dies, gages, etc., has approved plans for new plant at McChesneytown, Pa., for manufacture of equipment for Government, comprising main one-story unit, about 60 x 125 ft., and smaller buildings. Cost close to $100,000 with equipment.

Superintendent of Industries, United States Penitentiary, Lewisburg, Pa., asks bids until March 25 for 100,000 ball bearing rollers (Circular JPI-41-1263), 500,000 stove bolts and 200,000 machine screws (Circular JPI-41-1265).

Glenn L. Martin Co., Middle River, Baltimore, airplanes and parts, has let general contract to Consolidated Engineering Co., 20 East Franklin Street, for one-story engineering building, about 101,000 sq. ft. of floor space. Cost close to $500,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for metal furniture and equipment for Naval Medical Center, Washington (Specifications 10190).

Bethlehem-Fairfield Shipyard, Inc., Baltimore, recently organized interest of Bethlehem Steel Co., Shipbuilding Division, 1101 Key Highway, has taken over site of former plant of Union Shipbuilding Co., in Fairfield district, for new shipbuilding works for construction of vessels for United States Maritime Commission, comprising 13 shipways, and miscellaneous structures. Company also has acquired former plant of Pullman-Standard Steel Car Co., Curtis Bay, and will modernize for steel fabricating works to be operated in conjunction with new shipyard. Fund of $7,838,000 will be furnished by Government for entire project.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 27 for hacksaw blades (Schedule 5784), ratchet braces and drills, breast and hand drills (Schedule 5808), lathe tool holders (Schedule 5814); until March 28 for motor-driven air compressor (Schedule 5757).

Tool Engineering Service Co., Nutley, N. J., recently organized to manufacture precision scraped bench plates and gages, has purchased a building at 243 Washington Street for plant. Edward C. Reid is president.

The South

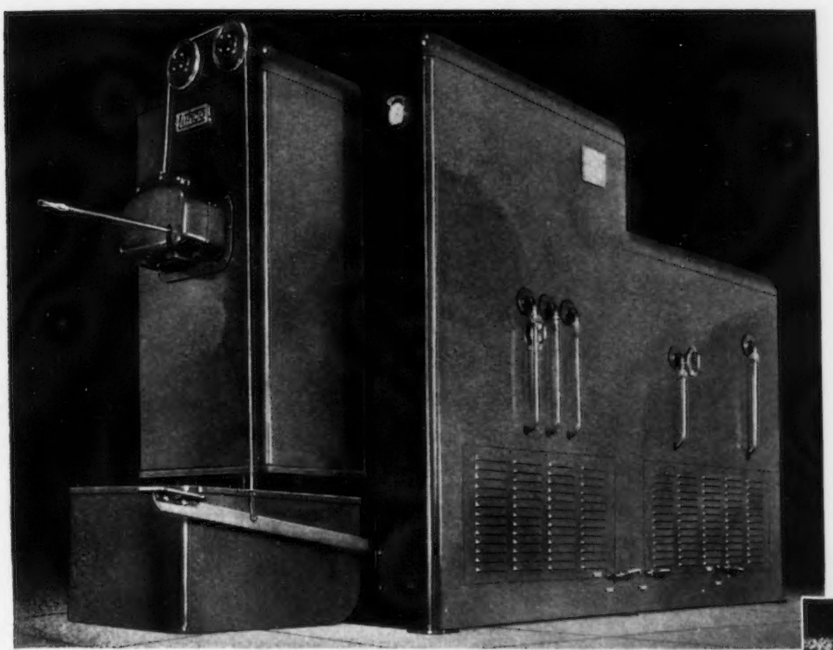
● **Columbian Iron Works, Inc.,** 2501 Chestnut Street, Chattanooga, Tenn., iron and steel products, plans expansion for production of shells for Government, in former plant of Star Box & Printing Co., recently secured under lease. Cost about $188,000. Fund to be furnished by Government.

Tampa Shipbuilding Co., Tampa, Fla., has purchased adjoining waterfront site of 15 acres for two new shipways, 110 x 650 ft., and 100 x 300 ft., with outfitting docks, shops and other structures, for construction of vessels for Navy Department, including repair yard facilities, recently announced. Also will build one-story storage and distributing building, and install 30-ton gantry crane, and other mechanical-handling equipment. Cost about $1,000,000. Fund in that amount is being furnished by Government.

Tennessee Products Corp., Cummins Station, Nashville, Tenn., coal tar and wood distillation products, plans expansion in by-products

LITHCO

..clean hardening plus!



Check these advantages:

DECARB-FREE HARDENING

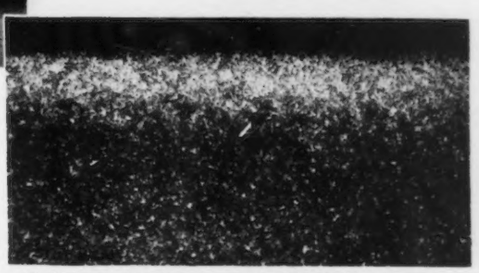
STEPPED-UP PRODUCTION

NO ATMOSPHERE ADJUSTMENTS

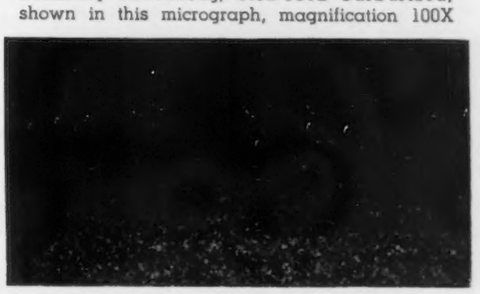
AUTOMATIC CONTROL

ECONOMICAL OPERATION

UNIFORMITY OF PRODUCT



Ordinary hardening, SAE-3312 Carburized, shown in this micrograph, magnification 100X

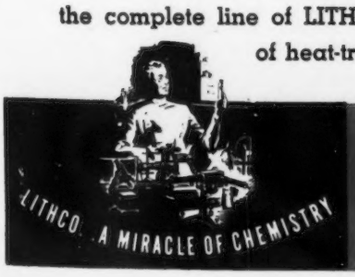


LITHCO hardening SAE-3312 Carburized—no decarburization, carburization or scaling.

All these are vital factors in present-day production schedules—all are tangible features of the LITHCO atmosphere furnaces.

There is no decarburization, no carburization, and no scaling—cannot nitride or cause hydrogen embrittlement. Steels of any carbon analysis can be heated simultaneously; no chemical or mechanical adjustments are necessary. The LITHCO atmosphere is neutralizing, thus difficulties from water vapor and other oxidizing gases are eliminated.

The results, so outstanding in uniformity, quality, simplicity and economy, mark a definite advancement in the heating of metals. Write today for illustrated literature describing the complete line of LITHCO batch and continuous types of heat-treating and gas-carburizing units.



THE LITHIUM CORPORATION

GENERAL OFFICES

RAYMOND-COMMERCE BLDG., NEWARK, NEW JERSEY

coke plant to double present capacity. Also will erect new buildings for storage and distribution. Cost about $1,750,000 with machinery.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until March 25 for two hydraulic turbines, each 44,000-hp. capacity, vertical shaft, adjustable propeller runner type, with or without governors, for new hydroelectric power station at Fort Loudoun; two vertical-type electric generators, each 35,500-kw., three-phase, for connection with hydraulic turbines noted; until March 26 for steel cable racks and trays for Wilson project.

Smith-Douglass Co., Inc., Board of Trade Building, Norfolk, Va., commercial fertilizers, chemical products, etc., has let contract to Chemical Construction Co., 30 Rockefeller Plaza, New York, for additions to plant in South Money Point district for expansion in sulphuric acid division. Cost close to $250,000 with machinery.

City Council, Lafayette, La., asks bids until April 1 for electric generating unit and auxiliary equipment in municipal power plant, where expansion will be carried out. Cost about $125,000.

Swift & Co., Union Stock Yards, Chicago, have let general contract to A. Farnell Blair, 215 Church Street, Decatur, Ga., for new five-story and basement edible oil and lard-refining plant at 565 Wells Street, S. W., Atlanta, Ga., 60 x 110 ft. Cost over $125,000 with equipment.

W. G. Avery Body Co., Larson Street, Jackson, Miss., automobile bodies, has let general contract to E. B. Ludwig Construction Co., Inc., 1350 Jefferson Highway, New Orleans, for one-story addition, 60 x 120 ft. Cost close to $60,000 with equipment.

War Department, Washington, has let joint contract to Manhattan Construction Co., Muskogee, Okla., and Long Construction Co., Philtower Building, Tulsa, Okla., for plant for assembling of bomber-type aircraft at Tulsa, Okla., where city will furnish large tract. Plant will be operated on cost-plus-fixed-fee basis by Douglas Aircraft Co., Santa Monica, Cal. It will comprise main one-story, windowless-type, air-conditioned structure, 320 x 4000 ft., and smaller structures, with power house. Cost about $13,476,000, of which over $3,000,000 will be expended for equipment, fund to be furnished by Government.

Central Power & Light Co., Corpus Christi, Tex., has asked bids on general contract for addition to local steam-electric generating plant, installation to include a 15,000-kw. turbine-generator unit, high-pressure boilers and auxiliary equipment. Cost over $750,000. Sargent & Lundy, Inc., 140 South Dearborn Street, Chicago, is consulting engineer.

Central States

• **King Machine Co.,** Clifton Street and B. & O. Railroad, Cincinnati, heavy machine tools and parts, has purchased land near plant for one-story addition and auxiliary structures for production of equipment for Navy Department. Cost about $1,575,000 with machinery, fund to be furnished by Government.

Decker-Reichert Steel Co., 4500 Train Avenue, Cleveland, iron and steel products, has let general contract to H. L. Vokes Co., 5300 Chester Avenue, for two-story addition, 50 x 90 ft., with one-story wing extension, 30 x 30 ft., for storage and distribution. Cost close to $50,000 with equipment.

Browning Crane & Shovel Co., 16226 Waterloo Road, Cleveland, has let general contract to Gillmore, Carmichael, Olson Co., 1753 East Fifty-fifth Street, for one-story addition, 60 x 150 ft., for an assembling unit. Cost over $85,000 with equipment.

John Harsch Bronze & Foundry Co., 12502 Berea Street, Cleveland, brass, bronze and other metal castings, has let general contract to H. L. Vokes Co., 5300 Chester Avenue, for one-story addition, 40 x 140 ft. Cost close to $80,000 with equipment. Simon & Simon, last noted address, are architects.

Spicer Mfg. Corp., 4100 Bennett Road, Toledo, Ohio, universal joints and other automotive products, plans one-story addition in spring for expansion in production department. Cost close to $350,000 with equipment.

Southern Indiana Gas & Electric Co., Evansville, Ind., plans addition to local steam-electric generating plant, including new 20,000-kw. turbine-generator unit and accessories, high-pressure boiler with capacity of 225,000 lb. of steam per hour, and auxiliary equipment, including condensers, switchgear, etc. Cost over $1,000,000 with transmission line extensions.

G. M. Diehl Machine Co., 981 South Wabash Avenue, Wabash, Ind., wood-working machinery and parts, has authorized plans for one and two-story additions and improvements in present structures. Cost over $50,000 with equipment. Lennox & Matthews, Inc., Architects' and Builders' Building, Indianapolis, is architect.

Stearman Aircraft Co., South Oliver Road, Wichita, Kan., airplanes and parts, will begin superstructure soon for one-story addition, for which general contract recently was let to Walter Armagost Construction Co., Kauffman Building. Cost over $75,000 with equipment.

McQuay-Norris Mfg. Co., 2320 Marconi Avenue, St. Louis, piston rings, bearings, etc., plans new plant at Goodfellow and Bircher Avenues for production of armor piercing cores for small arms ammunition for War Department. Cost about $4,461,000, of which $2,961,000 will be expended for equipment. Government will furnish fund in amount noted.

Dearborn Tool & Die Co., Dearborn, Mich., has let general contract to C. W. Clark Co., Dearborn, for one-story addition. Cost close to $45,000 with equipment.

Dart Truck Co., Oak and Twenty-seventh Streets, Kansas City, Mo., motor trucks and parts, plans one-story addition, 112 x 130 ft. Cost close to $100,000 with equipment. Robert J. Raney, Union Station Building, is architect.

Municipal Service Commission, Wyandotte, Mich., asks bids until March 24 for boiler unit and other steam power equipment for municipal power plant, where expansion will be carried out. Entire project will cost about $500,000.

Aeronautical Products, Inc., 18102 Ryan Street, Detroit, aircraft parts and equipment, plans one-story addition for production of precision airplane parts for landing gears, engines, etc., output to be used by War Department. Cost about $495,880 with equipment, fund to be provided by Government.

Peerless Tool & Engineering Co., 4431 West Division Street, Chicago, tools, machine equipment, etc., has let general contract to Northern Builders, Inc., 4002 West Addison Street, for new one-story plant, 122 x 150 ft., at Haddon and Kilbourne Avenues. Cost about $85,000 with equipment. Walter Sobel, 540 North Michigan Avenue, is architect.

Buick Motor Car Co., Flint, Mich., has asked bids on general contract for new plant on 125-acre tract at Melrose Park for production of Pratt & Whitney type airplane engines for Government. It will comprise two main one-story units, 752 x 1305 ft., and 60 x 268 ft., with three-story office structure, 50 x 274 ft. Fund of about $30,000,000 has been appropriated by Government for entire project. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

Allis-Chalmers Mfg. Co., South Seventieth Street, West Allis, Wis., heavy electrical equipment and machinery, has let general contract to Permanent Construction Co., 2712 North Holton Street, Milwaukee, for one-story addition, 200 x 230 ft., as a tank and plate shop. Cost close to $200,000 with equipment.

City Council, Brighton, Colo., plans municipal power plant and electrical distribution system. Cost about $290,000. Special election has been called April 1 to approve bonds in that amount.

Gunite Foundries Corp., Peoples Avenue, Rockford, Ill., iron castings, brake drums and allied equipment, plans one-story addition for production of machine tool castings for Government. Cost about $200,000 with equipment.

Borg-Warner Corp., Spring Division, 319 North Albany Avenue, Chicago, has let general contract to Enjay Construction Co., 160 North LaSalle Street, for new one and two-story plant on Foster Avenue, about 40,000 sq. ft. of floor space, for steel spring and allied products manufacture. Cost close to $150,000 with equipment.

D. A. Stuart Oil Co., 2727 South Troy Street, Chicago, is erecting a two-story and basement addition, which will provide 3000 ft. of additional manufacturing space. Cost about $50,000 with equipment.

Pure Oil Co., Toledo, Ohio, will build a new aviation gasoline refinery at its East Bay shore plant, to cost about $500,000.

Western States

• **Ohio Ferro Alloys Corp.,** Canton, Ohio, plans new branch plant at Tacoma, Wash., where 10-acre tract near Alexander Way and Wapato Waterway has been acquired. It will consist of several one-story buildings, with electric furnace units and accessories. Company has signed contract for electric power supply from municipal power station on basis of initial load of 6500-kw., to be increased later to 13,000-kw. Cost about $250,000 with equipment.

Western Auto Supply Co., 1242 First Street South, Seattle, automobile equipment, parts, etc., has let general contract to Ertz-Burns Co., Pittock Block, Portland, for new one-story storage and distributing plant, about 80,000 sq. ft. of floor space, at North Columbia Boulevard and Fiske Street, Portland. Cost over $150,000 with equipment.

Los Angeles Shipbuilding & Dry Dock Corp., Smith's Island, San Pedro, Los Angeles, has let general contract to Pozzo Construction Co., 2403 Riverside Drive, for one-story equipment storage and distributing building, 160 x 240 ft. Cost about $80,000 with equipment. Holmes & Narver, 639 South Spring Street, are architects.

Tacoma School Board, Central Grade School Building, Tacoma, Wash., has asked bids on general contract for one-story, U-shaped vocational school, 75 x 240 ft., with foundations for a second story later. Cost over $85,000 with equipment. Mock & Morrison, Perkins Building, are architects.

Todd Shipbuilding Co. of California, Latham Square Building, Oakland, Cal., Henry J. Kaiser, president, recently organized, is beginning work on new shipbuilding plant at Richmond, Cal. Plans have been approved for immediate erection of one-story mold loft and other shop units. Cost over $150,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 1 for one motor-driven double housing planer, 36 x 36 in., by 12 ft., for Mare Island Navy Yard (Schedule 5819).

Canada

• **Chrysler Corp. of Canada, Ltd.,** Windsor, Ont., has let general contract to Hein Construction Co., Ltd., 172 Olymer Street, for one-story addition, 50 x 160 ft. Cost over $85,000 with equipment. Hutton & Souter, Pigott Building, Hamilton, Ont., are architects.

Canadian Industries, Inc., Montreal, will begin work this month on new rayon mill on 100-acre tract near Kingston, Ont., for production of nylon. Main unit will be one-story, 190 x 375 ft., with power house, 45 x 85 ft., and pumping station, 25 x 30 ft.; also one-story structures for storage, distribution and other service, and two-story office building, 35 x 100 ft. Cost about $750,000 with machinery. General contract has been let to Anglin Norcross Ontario, Ltd., Toronto.

British American Oil Co., Ltd., Royal Bank Building, Toronto, Ont., plans new one-story oil processing and compounding plant for production of lubricating oils. Cost close to $120,000 with equipment.